
A. I. A. FILE NO. 8-B-2

11/6/84

# A PORTFOLIO
## OF
# DETAIL PLATES
## AND
## GENERAL INFORMATION

INDIANA LIMESTONE INSTITUTE
P. O. BOX 471 · BEDFORD, INDIANA

# DEDICATION

This brochure is dedicated, in grateful acknowledgment, to the thousands of architects and engineers throughout the United States and Canada who have demonstrated their continued faith in Indiana Limestone by repeatedly specifying its use.

# FOREWORD

The primary purpose in the issuance of this brochure is to convey to the members of the architectural and engineering professions the information that the Indiana Limestone Institute is designed to be an instrument of service to them whenever and wherever it is found possible to render service.

The Institute is ready and anxious at all times to answer inquiries concerning problems having to do with the matter of proper selection of the various types of our product, which selection may contribute to greater economy without sacrifice of appearance or structural values.

The Institute is also ready at all times to study any specific problems which may arise in connection with the use of our material and to furnish the desired information quickly and conclusively.

You are invited to make use of this service . . . and as frequently as you may choose.

# MEMBERS

### *At Bloomington, Indiana*

IVAN L. ADAMS

THE BLOOMINGTON LIMESTONE CORPORATION

EMPIRE STONE COMPANY

FAGAN STONE COMPANY

FORBURGER-HARRIS STONE COMPANY

B. G. HOADLEY QUARRIES, INC.

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INDEPENDENT LIMESTONE COMPANY

THE INDIAN HILL STONE COMPANY

MATTHEWS BROTHERS COMPANY

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TEXAS QUARRIES, INC.

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### *At Bedford, Indiana*

BEDFORD STONE SERVICE, INC.

THE CARL FURST COMPANY

HELTONVILLE LIMESTONE COMPANY

INGALLS STONE COMPANY

### *At Ellettsville, Indiana*

HARDING & COGSWELL

SUMMITT-COGSWELL CORPORATION

# TOWARD A REDUCED COST

Today's cost of construction is so high that any price advantage . . . without sacrifice of appearance, durability or structural value . . . must, of course, appeal immediately to every architect.

It is for this reason that we believe a closer study of the more practical uses of Indiana Oolitic Limestone will result in greater economy.

It is suggested, therefore, that the "Select" type be specified for those portions of any structure coming within the reach of normal vision, such as interiors, window and door trim, carvings, inscriptions and wall surfaces in the lower stories. Above the lower stories, it is suggested that the "Standard" type be specified and the "Rustic" type for extreme heights, for wall copings generally and for isolated sills, lintels and band courses.

Generally speaking . . . and avoiding any reference to technical language . . . the three classifications differ in only one respect: the "Select" stone possesses a finer grain and less noticeable natural markings than the "Standard" and "Rustic". The more expensive "Select" stone possesses no more structural strength, no more durability and no more resistance to the elements than do the "Standard" and the "Rustic".

When specifications call for "Select" throughout (often even to the inclusion of parapets and roof copings), a great deal of extra quarrying and handling by the quarryman and cut stone contractor is required . . . for the procurable quantity of " Select" stone is relatively small, and the necessary extra quarrying and extra handling involves greater cost. This is equally true with either the Buff or Gray varieties.

It requires but brief reflection to realize that acceptance of these statements and suggestions will in no way operate to the impairment of the beauty, structural strength or durability of any Indiana Limestone building, but will contribute to the attainment of a highly satisfactory completed product at lower cost.

Our technical counsel and bid-procurement services are yours for the asking.

# LET'S WORK TOGETHER TO MAKE THE JOB BETTER

The cooperation of the general contractor and/or the stone setter is very definitely needed and desired, toward the end that trouble, delay and expense may be reduced to a minimum and, by this process, greater satisfaction rendered the architect and owner.

The following suggestions, then, are offered in the hope that they will be accepted in the spirit which prompts their issuance, which is to obtain as nearly as possible the objective outlined in the preceding paragraph.

# IN THE INTEREST OF A BETTER JOB

All too frequently, nowadays, it is difficult to secure sufficient, or any laborers who are really experienced in the proper handling of cut Indiana Limestone out of cars and trucks, in storing and distributing it through and around buildings under construction. Some laborers have the idea that, because the material is stone, it can be handled roughly without damage. Of course, nothing could be farther from the truth.

The arrises (or edges) should be carefully guarded against snipping and breakage by avoiding the use of pinch bars in moving pieces of cut stone and by setting them down without force or jarring. If pinch bars are used, place an old rubber tire or tube between the bar and the stone.

Where the use of rollers is necessary, care should be used that these rollers be of wood.

Sliding stone down truck skids should always be done by using the back of the stone in contact with the skids—never the face or top or bottom beds. Additional protection may be had by using as a bed or cushion, the excelsior usually found in the car or truck.

*Never* set the stone down against the earth. This avoids staining from moisture and mud. Always set the stone on wooden skids *which are first covered with a waterproof paper.* This will help to prevent the appearance of white skid marks, resulting from the skids having drawn any moisture from the stone at points of contact. This is especially advisable where cut stone must be unloaded and stored for a long period before setting. Avoid chestnut, walnut, oak, certain firs, and other woods containing tannin.

All stone stored at the site or elsewhere should be kept carefully covered with waterproof paper to keep it as clean as possible before setting.

Don't set dirty stone or neglect the washing of stone before setting.

Don't use salt to thaw ice on the face of cut stone or to thaw ice in anchor or lewis holes.

Don't permit wash from concrete floor construction or scaffolding to run down onto walls during construction.

Don't permit oils or grease, or compounds containing them, to come in contact with the stone. This also applies to new ropes, which usually contain tar.

Don't set stone in mortar containing ordinary Portland Cement. Use a recognized non-staining cement. This is also recommended for use in mortar for backing-up material.

Don't set stone against concrete work without first having painted the face of the concrete with a heavy coat of approved asphaltic waterproofing compound.

Don't use sand of questionable quality in setting and pointing mortars. Be sure that the water used is clean and free of impurities.

Don't allow smoke from hoisting engines or salamanders to mar the face of cut stone.

Be sure that all projecting courses, sills, entrance cheek blocks, entrance doorways and all stonework exposed to traffic contact of other trades, are properly and carefully protected with wood.

**And, above all, don't leave unfinished walls uncovered at night or during heavy rains AT ANY TIME. This will prevent staining of the stone and the later appearance of white efflorescence on brick work as well as on the stone. Failure to follow this advice has been the cause of much trouble, dissatisfaction and expense.**

When stone has arrived in a broken or damaged condition, the attention of the carrier's agent should be called to the condition and a notation as to the damage be acknowledged by him. This is necessary because the shipper holds a receipt from the carrier showing that the shipment was in good order when received by the carrier. Claims for such damage MUST be based upon the possession of freight bills bearing the notation of the damage.

**Boiled down, all the above simply means cooperation and ordinary care. Result—greater satisfaction and a better looking job.**

# HEIGHTS OF BRICK COURSES

| Courses | 4 BRICKS + 4 JOINTS EQUAL | | | | | | | | | | | | | | | | | | | | | | | | Courses |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10″ | | | 10¼″ | | | 10½″ | | | 10¾″ | | | 11″ | | | 11¼″ | | | 11½″ | | | 11¾″ | | | 12″ | | | |
| | Ft. | In. | 16ths | Ft. | In. | 16ths | Ft. | In. | 16ths | Ft. | In. | 16ths | Ft. | In. | 16ths | Ft. | In. | 16ths | Ft. | In. | 16ths | Ft. | In. | 16ths | Ft. | In. | 16ths | |
| 1 | | 2 | 8 | | 2 | 9 | | 2 | 10 | | 2 | 11 | | 2 | 12 | | 2 | 13 | | 2 | 14 | | 2 | 15 | | 3 | 0 | 1 |
| 2 | | 5 | 0 | | 5 | 2 | | 5 | 4 | | 5 | 6 | | 5 | 8 | | 5 | 10 | | 5 | 12 | | 5 | 14 | | 6 | 0 | 2 |
| 3 | | 7 | 8 | | 7 | 11 | | 7 | 14 | | 8 | 1 | | 8 | 4 | | 8 | 7 | | 8 | 10 | | 8 | 13 | | 9 | 0 | 3 |
| 4 | | 10 | 0 | | 10 | 4 | | 10 | 8 | | 10 | 12 | | 11 | 0 | | 11 | 4 | | 11 | 8 | | 11 | 12 | 1 | 0 | 0 | 4 |
| 5 | 1 | 0 | 8 | 1 | 0 | 13 | 1 | 1 | 2 | 1 | 1 | 7 | 1 | 1 | 12 | 1 | 2 | 1 | 1 | 2 | 6 | 1 | 2 | 11 | 1 | 3 | 0 | 5 |
| 6 | 1 | 3 | 0 | 1 | 3 | 6 | 1 | 3 | 12 | 1 | 4 | 2 | 1 | 4 | 8 | 1 | 4 | 14 | 1 | 5 | 4 | 1 | 5 | 10 | 1 | 6 | 0 | 6 |
| 7 | 1 | 5 | 8 | 1 | 5 | 15 | 1 | 6 | 6 | 1 | 6 | 13 | 1 | 7 | 4 | 1 | 7 | 11 | 1 | 8 | 2 | 1 | 8 | 9 | 1 | 9 | 0 | 7 |
| 8 | 1 | 8 | 0 | 1 | 8 | 8 | 1 | 9 | 0 | 1 | 9 | 8 | 1 | 10 | 0 | 1 | 10 | 8 | 1 | 11 | 0 | 1 | 11 | 8 | 2 | 0 | 0 | 8 |
| 9 | 1 | 10 | 8 | 1 | 11 | 1 | 1 | 11 | 10 | 2 | 0 | 3 | 2 | 0 | 12 | 2 | 1 | 5 | 2 | 1 | 14 | 2 | 2 | 7 | 2 | 3 | 0 | 9 |
| 10 | 2 | 1 | 0 | 2 | 1 | 10 | 2 | 2 | 4 | 2 | 2 | 14 | 2 | 3 | 8 | 2 | 4 | 2 | 2 | 4 | 12 | 2 | 5 | 6 | 2 | 6 | 0 | 10 |
| 11 | 2 | 3 | 8 | 2 | 4 | 3 | 2 | 4 | 14 | 2 | 5 | 9 | 2 | 6 | 4 | 2 | 6 | 15 | 2 | 7 | 10 | 2 | 8 | 5 | 2 | 9 | 0 | 11 |
| 12 | 2 | 6 | 0 | 2 | 6 | 12 | 2 | 7 | 8 | 2 | 8 | 4 | 2 | 9 | 0 | 2 | 9 | 12 | 2 | 10 | 8 | 2 | 11 | 4 | 3 | 0 | 0 | 12 |
| 13 | 2 | 8 | 8 | 2 | 9 | 5 | 2 | 10 | 2 | 2 | 10 | 15 | 2 | 11 | 12 | 3 | 0 | 9 | 3 | 1 | 6 | 3 | 2 | 3 | 3 | 3 | 0 | 13 |
| 14 | 2 | 11 | 0 | 2 | 11 | 14 | 3 | 0 | 12 | 3 | 1 | 10 | 3 | 2 | 8 | 3 | 3 | 6 | 3 | 4 | 4 | 3 | 5 | 2 | 3 | 6 | 0 | 14 |
| 15 | 3 | 1 | 8 | 3 | 2 | 7 | 3 | 3 | 6 | 3 | 4 | 5 | 3 | 5 | 4 | 3 | 6 | 3 | 3 | 7 | 2 | 3 | 8 | 1 | 3 | 9 | 0 | 15 |
| 16 | 3 | 4 | 0 | 3 | 5 | 0 | 3 | 6 | 0 | 3 | 7 | 0 | 3 | 8 | 0 | 3 | 9 | 0 | 3 | 10 | 0 | 3 | 11 | 0 | 4 | 0 | 0 | 16 |
| 17 | 3 | 6 | 8 | 3 | 7 | 9 | 3 | 8 | 10 | 3 | 9 | 11 | 3 | 10 | 12 | 3 | 11 | 13 | 4 | 0 | 14 | 4 | 1 | 15 | 4 | 3 | 0 | 17 |
| 18 | 3 | 9 | 0 | 3 | 10 | 2 | 3 | 11 | 4 | 4 | 0 | 6 | 4 | 1 | 8 | 4 | 2 | 10 | 4 | 3 | 12 | 4 | 4 | 14 | 4 | 6 | 0 | 18 |
| 19 | 3 | 11 | 8 | 4 | 0 | 11 | 4 | 1 | 14 | 4 | 3 | 1 | 4 | 4 | 4 | 4 | 5 | 7 | 4 | 6 | 10 | 4 | 7 | 13 | 4 | 9 | 0 | 19 |
| 20 | 4 | 2 | 0 | 4 | 3 | 4 | 4 | 4 | 8 | 4 | 5 | 12 | 4 | 7 | 0 | 4 | 8 | 4 | 4 | 9 | 8 | 4 | 10 | 12 | 5 | 0 | 0 | 20 |
| 21 | 4 | 4 | 8 | 4 | 5 | 13 | 4 | 7 | 2 | 4 | 8 | 7 | 4 | 9 | 12 | 4 | 11 | 1 | 5 | 0 | 6 | 5 | 1 | 11 | 5 | 3 | 0 | 21 |
| 22 | 4 | 7 | 0 | 4 | 8 | 6 | 4 | 9 | 12 | 4 | 11 | 2 | 5 | 0 | 8 | 5 | 1 | 14 | 5 | 3 | 4 | 5 | 4 | 10 | 5 | 6 | 0 | 22 |
| 23 | 4 | 9 | 8 | 4 | 10 | 15 | 5 | 0 | 6 | 5 | 1 | 13 | 5 | 3 | 4 | 5 | 4 | 11 | 5 | 6 | 2 | 5 | 7 | 9 | 5 | 9 | 0 | 23 |
| 24 | 5 | 0 | 0 | 5 | 1 | 8 | 5 | 3 | 0 | 5 | 4 | 8 | 5 | 6 | 0 | 5 | 7 | 8 | 5 | 9 | 0 | 5 | 10 | 8 | 6 | 0 | 0 | 24 |
| 25 | 5 | 2 | 8 | 5 | 4 | 1 | 5 | 5 | 10 | 5 | 7 | 3 | 5 | 8 | 12 | 5 | 10 | 5 | 5 | 11 | 14 | 6 | 1 | 7 | 6 | 3 | 0 | 25 |
| 26 | 5 | 5 | 0 | 5 | 6 | 10 | 5 | 8 | 4 | 5 | 9 | 14 | 5 | 11 | 8 | 6 | 1 | 2 | 6 | 2 | 12 | 6 | 4 | 6 | 6 | 6 | 0 | 26 |
| 27 | 5 | 7 | 8 | 5 | 9 | 3 | 5 | 10 | 14 | 6 | 0 | 9 | 6 | 2 | 4 | 6 | 3 | 15 | 6 | 5 | 10 | 6 | 7 | 5 | 6 | 9 | 0 | 27 |
| 28 | 5 | 10 | 0 | 5 | 11 | 12 | 6 | 1 | 8 | 6 | 3 | 4 | 6 | 5 | 0 | 6 | 6 | 12 | 6 | 8 | 8 | 6 | 10 | 4 | 7 | 0 | 0 | 28 |
| 29 | 6 | 0 | 8 | 6 | 2 | 5 | 6 | 4 | 2 | 6 | 5 | 15 | 6 | 7 | 12 | 6 | 9 | 9 | 6 | 11 | 6 | 7 | 1 | 3 | 7 | 3 | 0 | 29 |
| 30 | 6 | 3 | 0 | 6 | 4 | 14 | 6 | 6 | 12 | 6 | 8 | 10 | 6 | 10 | 8 | 7 | 0 | 6 | 7 | 2 | 4 | 7 | 4 | 2 | 7 | 6 | 0 | 30 |
| 31 | 6 | 5 | 8 | 6 | 7 | 7 | 6 | 9 | 6 | 6 | 11 | 5 | 7 | 1 | 4 | 7 | 3 | 3 | 7 | 5 | 2 | 7 | 7 | 1 | 7 | 9 | 0 | 31 |
| 32 | 6 | 8 | 0 | 6 | 10 | 0 | 7 | 0 | 0 | 7 | 2 | 0 | 7 | 4 | 0 | 7 | 6 | 0 | 7 | 8 | 0 | 7 | 10 | 0 | 8 | 0 | 0 | 32 |
| 33 | 6 | 10 | 8 | 7 | 0 | 9 | 7 | 2 | 10 | 7 | 4 | 11 | 7 | 6 | 12 | 7 | 8 | 13 | 7 | 10 | 14 | 8 | 0 | 15 | 8 | 3 | 0 | 33 |
| 34 | 7 | 1 | 0 | 7 | 3 | 2 | 7 | 5 | 4 | 7 | 7 | 6 | 7 | 9 | 8 | 7 | 11 | 10 | 8 | 1 | 12 | 8 | 3 | 14 | 8 | 6 | 0 | 34 |
| 35 | 7 | 3 | 8 | 7 | 5 | 11 | 7 | 7 | 14 | 7 | 10 | 1 | 8 | 0 | 4 | 8 | 2 | 7 | 8 | 4 | 10 | 8 | 6 | 13 | 8 | 9 | 0 | 35 |
| 36 | 7 | 6 | 0 | 7 | 8 | 4 | 7 | 10 | 8 | 8 | 0 | 12 | 8 | 3 | 0 | 8 | 5 | 4 | 8 | 7 | 8 | 8 | 9 | 12 | 9 | 0 | 0 | 36 |
| 37 | 7 | 8 | 8 | 7 | 10 | 13 | 8 | 1 | 2 | 8 | 3 | 7 | 8 | 5 | 12 | 8 | 8 | 1 | 8 | 10 | 6 | 9 | 0 | 11 | 9 | 3 | 0 | 37 |
| 38 | 7 | 11 | 0 | 8 | 1 | 6 | 8 | 3 | 12 | 8 | 6 | 2 | 8 | 8 | 8 | 8 | 10 | 14 | 9 | 1 | 4 | 9 | 3 | 10 | 9 | 6 | 0 | 38 |
| 39 | 8 | 1 | 8 | 8 | 3 | 15 | 8 | 6 | 6 | 8 | 8 | 13 | 8 | 11 | 4 | 9 | 1 | 11 | 9 | 4 | 2 | 9 | 6 | 9 | 9 | 9 | 0 | 39 |
| 40 | 8 | 4 | 0 | 8 | 6 | 8 | 8 | 9 | 0 | 8 | 11 | 8 | 9 | 2 | 0 | 9 | 4 | 8 | 9 | 7 | 0 | 9 | 9 | 8 | 10 | 0 | 0 | 40 |
| 41 | 8 | 6 | 8 | 8 | 9 | 1 | 8 | 11 | 10 | 9 | 2 | 3 | 9 | 4 | 12 | 9 | 7 | 5 | 9 | 9 | 14 | 10 | 0 | 7 | 10 | 3 | 0 | 41 |
| 42 | 8 | 9 | 0 | 8 | 11 | 10 | 9 | 2 | 4 | 9 | 4 | 14 | 9 | 7 | 8 | 9 | 10 | 2 | 10 | 0 | 12 | 10 | 3 | 6 | 10 | 6 | 0 | 42 |
| 43 | 8 | 11 | 8 | 9 | 2 | 3 | 9 | 4 | 14 | 9 | 7 | 9 | 9 | 10 | 4 | 10 | 0 | 15 | 10 | 3 | 10 | 10 | 6 | 5 | 10 | 9 | 0 | 43 |
| 44 | 9 | 2 | 0 | 9 | 4 | 12 | 9 | 7 | 8 | 9 | 10 | 4 | 10 | 1 | 0 | 10 | 3 | 12 | 10 | 6 | 8 | 10 | 9 | 4 | 11 | 0 | 0 | 44 |
| 45 | 9 | 4 | 8 | 9 | 7 | 5 | 9 | 10 | 2 | 10 | 0 | 15 | 10 | 3 | 12 | 10 | 6 | 9 | 10 | 9 | 6 | 11 | 0 | 3 | 11 | 3 | 0 | 45 |
| 46 | 9 | 7 | 0 | 9 | 9 | 14 | 10 | 0 | 12 | 10 | 3 | 10 | 10 | 6 | 8 | 10 | 9 | 6 | 11 | 0 | 4 | 11 | 3 | 2 | 11 | 6 | 0 | 46 |
| 47 | 9 | 9 | 8 | 10 | 0 | 7 | 10 | 3 | 6 | 10 | 6 | 5 | 10 | 9 | 4 | 11 | 0 | 3 | 11 | 3 | 2 | 11 | 6 | 1 | 11 | 9 | 0 | 47 |
| 48 | 10 | 0 | 0 | 10 | 3 | 0 | 10 | 6 | 0 | 10 | 9 | 0 | 11 | 0 | 0 | 11 | 3 | 0 | 11 | 6 | 0 | 11 | 9 | 0 | 12 | 0 | 0 | 48 |
| 49 | 10 | 2 | 8 | 10 | 5 | 9 | 10 | 8 | 10 | 10 | 11 | 11 | 11 | 2 | 12 | 11 | 5 | 13 | 11 | 8 | 14 | 11 | 11 | 15 | 12 | 3 | 0 | 49 |
| 50 | 10 | 5 | 0 | 10 | 8 | 2 | 10 | 11 | 4 | 11 | 2 | 6 | 11 | 5 | 8 | 11 | 8 | 10 | 11 | 11 | 12 | 12 | 2 | 14 | 12 | 6 | 0 | 50 |

# HEIGHTS OF BRICK COURSES

| Courses | 4 BRICKS + 4 JOINTS EQUAL | | | | | | | | | | | | | | | | | | | | | | | | Courses |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10″ | | | 10¼″ | | | 10½″ | | | 10¾″ | | | 11″ | | | 11¼″ | | | 11½″ | | | 11¾″ | | | 12″ | | | |
| | Ft. | In. | 16ths | Ft. | In. | 16ths | Ft. | In. | 16ths | Ft. | In. | 16ths | Ft. | In. | 16ths | Ft. | In. | 16ths | Ft. | In. | 16ths | Ft. | In. | 16ths | Ft. | In. | 16ths | |
| 51 | 10 | 7 | 8 | 10 | 10 | 11 | 11 | 1 | 14 | 11 | 5 | 1 | 11 | 8 | 4 | 11 | 11 | 7 | 12 | 2 | 10 | 12 | 5 | 13 | 12 | 9 | 0 | 51 |
| 52 | 10 | 10 | 0 | 11 | 1 | 4 | 11 | 4 | 8 | 11 | 7 | 12 | 11 | 11 | 0 | 12 | 2 | 4 | 12 | 5 | 8 | 12 | 8 | 12 | 13 | 0 | 0 | 52 |
| 53 | 11 | 0 | 8 | 11 | 3 | 13 | 11 | 7 | 2 | 11 | 10 | 7 | 12 | 1 | 12 | 12 | 5 | 1 | 12 | 8 | 6 | 12 | 11 | 11 | 13 | 3 | 0 | 53 |
| 54 | 11 | 3 | 0 | 11 | 6 | 6 | 11 | 9 | 12 | 12 | 1 | 2 | 12 | 4 | 8 | 12 | 7 | 14 | 12 | 11 | 4 | 13 | 2 | 10 | 13 | 6 | 0 | 54 |
| 55 | 11 | 5 | 8 | 11 | 8 | 15 | 12 | 0 | 6 | 12 | 3 | 13 | 12 | 7 | 4 | 12 | 10 | 11 | 13 | 2 | 2 | 13 | 5 | 9 | 13 | 9 | 0 | 55 |
| 56 | 11 | 8 | 0 | 11 | 11 | 8 | 12 | 3 | 0 | 12 | 6 | 8 | 12 | 10 | 0 | 13 | 1 | 8 | 13 | 5 | 0 | 13 | 8 | 8 | 14 | 0 | 0 | 56 |
| 57 | 11 | 10 | 8 | 12 | 2 | 1 | 12 | 5 | 10 | 12 | 9 | 3 | 13 | 0 | 12 | 13 | 4 | 5 | 13 | 7 | 14 | 13 | 11 | 7 | 14 | 3 | 0 | 57 |
| 58 | 12 | 1 | 0 | 12 | 4 | 10 | 12 | 8 | 4 | 12 | 11 | 14 | 13 | 3 | 8 | 13 | 7 | 2 | 13 | 10 | 12 | 14 | 2 | 6 | 14 | 6 | 0 | 58 |
| 59 | 12 | 3 | 8 | 12 | 7 | 3 | 12 | 10 | 14 | 13 | 2 | 9 | 13 | 6 | 4 | 13 | 9 | 15 | 14 | 1 | 10 | 14 | 5 | 5 | 14 | 9 | 0 | 59 |
| 60 | 12 | 6 | 0 | 12 | 9 | 12 | 13 | 1 | 8 | 13 | 5 | 4 | 13 | 9 | 0 | 14 | 0 | 12 | 14 | 4 | 8 | 14 | 8 | 4 | 15 | 0 | 0 | 60 |
| 61 | 12 | 8 | 8 | 13 | 0 | 5 | 13 | 4 | 2 | 13 | 7 | 15 | 13 | 11 | 12 | 14 | 3 | 9 | 14 | 7 | 6 | 14 | 11 | 3 | 15 | 3 | 0 | 61 |
| 62 | 12 | 11 | 0 | 13 | 2 | 14 | 13 | 6 | 12 | 13 | 10 | 10 | 14 | 2 | 8 | 14 | 6 | 6 | 14 | 10 | 4 | 15 | 2 | 2 | 15 | 6 | 0 | 62 |
| 63 | 13 | 1 | 8 | 13 | 5 | 7 | 13 | 9 | 6 | 14 | 1 | 5 | 14 | 5 | 4 | 14 | 9 | 3 | 15 | 1 | 2 | 15 | 5 | 1 | 15 | 9 | 0 | 63 |
| 64 | 13 | 4 | 0 | 13 | 8 | 0 | 14 | 0 | 0 | 14 | 4 | 0 | 14 | 8 | 0 | 15 | 0 | 0 | 15 | 4 | 0 | 15 | 8 | 0 | 16 | 0 | 0 | 64 |
| 65 | 13 | 6 | 8 | 13 | 10 | 9 | 14 | 2 | 10 | 14 | 6 | 11 | 14 | 10 | 12 | 15 | 2 | 13 | 15 | 6 | 14 | 15 | 10 | 15 | 16 | 3 | 0 | 65 |
| 66 | 13 | 9 | 0 | 14 | 1 | 2 | 14 | 5 | 4 | 14 | 9 | 6 | 15 | 1 | 8 | 15 | 5 | 10 | 15 | 9 | 12 | 16 | 1 | 14 | 16 | 6 | 0 | 66 |
| 67 | 13 | 11 | 8 | 14 | 3 | 11 | 14 | 7 | 14 | 15 | 0 | 1 | 15 | 4 | 4 | 15 | 8 | 7 | 16 | 0 | 10 | 16 | 4 | 13 | 16 | 9 | 0 | 67 |
| 68 | 14 | 2 | 0 | 14 | 6 | 4 | 14 | 10 | 8 | 15 | 2 | 12 | 15 | 7 | 0 | 15 | 11 | 4 | 16 | 3 | 8 | 16 | 7 | 12 | 17 | 0 | 0 | 68 |
| 69 | 14 | 4 | 8 | 14 | 8 | 13 | 15 | 1 | 2 | 15 | 5 | 7 | 15 | 9 | 12 | 16 | 2 | 1 | 16 | 6 | 6 | 16 | 10 | 11 | 17 | 3 | 0 | 69 |
| 70 | 14 | 7 | 0 | 14 | 11 | 6 | 15 | 3 | 12 | 15 | 8 | 2 | 16 | 0 | 8 | 16 | 4 | 14 | 16 | 9 | 4 | 17 | 1 | 10 | 17 | 6 | 0 | 70 |
| 71 | 14 | 9 | 8 | 15 | 1 | 15 | 15 | 6 | 6 | 15 | 10 | 13 | 16 | 3 | 4 | 16 | 7 | 11 | 17 | 0 | 2 | 17 | 4 | 9 | 17 | 9 | 0 | 71 |
| 72 | 15 | 0 | 0 | 15 | 4 | 8 | 15 | 9 | 0 | 16 | 1 | 8 | 16 | 6 | 0 | 16 | 10 | 8 | 17 | 3 | 0 | 17 | 7 | 8 | 18 | 0 | 0 | 72 |
| 73 | 15 | 2 | 8 | 15 | 7 | 1 | 15 | 11 | 10 | 16 | 4 | 3 | 16 | 8 | 12 | 17 | 1 | 5 | 17 | 5 | 14 | 17 | 10 | 7 | 18 | 3 | 0 | 73 |
| 74 | 15 | 5 | 0 | 15 | 9 | 10 | 16 | 2 | 4 | 16 | 6 | 14 | 16 | 11 | 8 | 17 | 4 | 2 | 17 | 8 | 12 | 18 | 1 | 6 | 18 | 6 | 0 | 74 |
| 75 | 15 | 7 | 8 | 16 | 0 | 3 | 16 | 4 | 14 | 16 | 9 | 9 | 17 | 2 | 4 | 17 | 6 | 15 | 17 | 11 | 10 | 18 | 4 | 5 | 18 | 9 | 0 | 75 |
| 76 | 15 | 10 | 0 | 16 | 2 | 12 | 16 | 7 | 8 | 17 | 0 | 4 | 17 | 5 | 0 | 17 | 9 | 12 | 18 | 2 | 8 | 18 | 7 | 4 | 19 | 0 | 0 | 76 |
| 77 | 16 | 0 | 8 | 16 | 5 | 5 | 16 | 10 | 2 | 17 | 2 | 15 | 17 | 7 | 12 | 18 | 0 | 9 | 18 | 5 | 6 | 18 | 10 | 3 | 19 | 3 | 0 | 77 |
| 78 | 16 | 3 | 0 | 16 | 7 | 14 | 17 | 0 | 12 | 17 | 5 | 10 | 17 | 10 | 8 | 18 | 3 | 6 | 18 | 8 | 4 | 19 | 1 | 2 | 19 | 6 | 0 | 78 |
| 79 | 16 | 5 | 8 | 16 | 10 | 7 | 17 | 3 | 6 | 17 | 8 | 5 | 18 | 1 | 4 | 18 | 6 | 3 | 18 | 11 | 2 | 19 | 4 | 1 | 19 | 9 | 0 | 79 |
| 80 | 16 | 8 | 0 | 17 | 1 | 0 | 17 | 6 | 0 | 17 | 11 | 0 | 18 | 4 | 0 | 18 | 9 | 0 | 19 | 2 | 0 | 19 | 7 | 0 | 20 | 0 | 0 | 80 |
| 81 | 16 | 10 | 8 | 17 | 3 | 9 | 17 | 8 | 10 | 18 | 1 | 11 | 18 | 6 | 12 | 18 | 11 | 13 | 19 | 4 | 14 | 19 | 9 | 15 | 20 | 3 | 0 | 81 |
| 82 | 17 | 1 | 0 | 17 | 6 | 2 | 17 | 11 | 4 | 18 | 4 | 6 | 18 | 9 | 8 | 19 | 2 | 10 | 19 | 7 | 12 | 20 | 0 | 14 | 20 | 6 | 0 | 82 |
| 83 | 17 | 3 | 8 | 17 | 8 | 11 | 18 | 1 | 14 | 18 | 7 | 1 | 19 | 0 | 4 | 19 | 5 | 7 | 19 | 10 | 10 | 20 | 3 | 13 | 20 | 9 | 0 | 83 |
| 84 | 17 | 6 | 0 | 17 | 11 | 4 | 18 | 4 | 8 | 18 | 9 | 12 | 19 | 3 | 0 | 19 | 8 | 4 | 20 | 1 | 8 | 20 | 6 | 12 | 21 | 0 | 0 | 84 |
| 85 | 17 | 8 | 8 | 18 | 1 | 13 | 18 | 7 | 2 | 19 | 0 | 7 | 19 | 5 | 12 | 19 | 11 | 1 | 20 | 4 | 6 | 20 | 9 | 11 | 21 | 3 | 0 | 85 |
| 86 | 17 | 11 | 0 | 18 | 4 | 6 | 18 | 9 | 12 | 19 | 3 | 2 | 19 | 8 | 8 | 20 | 1 | 14 | 20 | 7 | 4 | 21 | 0 | 10 | 21 | 6 | 0 | 86 |
| 87 | 18 | 1 | 8 | 18 | 6 | 15 | 19 | 0 | 6 | 19 | 5 | 13 | 19 | 11 | 4 | 20 | 4 | 11 | 20 | 10 | 2 | 21 | 3 | 9 | 21 | 9 | 0 | 87 |
| 88 | 18 | 4 | 0 | 18 | 9 | 8 | 19 | 3 | 0 | 19 | 8 | 8 | 20 | 2 | 0 | 20 | 7 | 8 | 21 | 1 | 0 | 21 | 6 | 8 | 22 | 0 | 0 | 88 |
| 89 | 18 | 6 | 8 | 19 | 0 | 1 | 19 | 5 | 10 | 19 | 11 | 3 | 20 | 4 | 12 | 20 | 10 | 5 | 21 | 3 | 14 | 21 | 9 | 7 | 22 | 3 | 0 | 89 |
| 90 | 18 | 9 | 0 | 19 | 2 | 10 | 19 | 8 | 4 | 20 | 1 | 14 | 20 | 7 | 8 | 21 | 1 | 2 | 21 | 6 | 12 | 22 | 0 | 6 | 22 | 6 | 0 | 90 |
| 91 | 18 | 11 | 8 | 19 | 5 | 3 | 19 | 10 | 14 | 20 | 4 | 9 | 20 | 10 | 4 | 21 | 3 | 15 | 21 | 9 | 10 | 22 | 3 | 5 | 22 | 9 | 0 | 91 |
| 92 | 19 | 2 | 0 | 19 | 7 | 12 | 20 | 1 | 8 | 20 | 7 | 4 | 21 | 1 | 0 | 21 | 6 | 12 | 22 | 0 | 8 | 22 | 6 | 4 | 23 | 0 | 0 | 92 |
| 93 | 19 | 4 | 8 | 19 | 10 | 5 | 20 | 4 | 2 | 20 | 9 | 15 | 21 | 3 | 12 | 21 | 9 | 9 | 22 | 3 | 6 | 22 | 9 | 3 | 23 | 3 | 0 | 93 |
| 94 | 19 | 7 | 0 | 20 | 0 | 14 | 20 | 6 | 12 | 21 | 0 | 10 | 21 | 6 | 8 | 22 | 0 | 6 | 22 | 6 | 4 | 23 | 0 | 2 | 23 | 6 | 0 | 94 |
| 95 | 19 | 9 | 8 | 20 | 3 | 7 | 20 | 9 | 6 | 21 | 3 | 5 | 21 | 9 | 4 | 22 | 3 | 3 | 22 | 9 | 2 | 23 | 3 | 1 | 23 | 9 | 0 | 95 |
| 96 | 20 | 0 | 0 | 20 | 6 | 0 | 21 | 0 | 0 | 21 | 6 | 0 | 22 | 0 | 0 | 22 | 6 | 0 | 23 | 0 | 0 | 23 | 6 | 0 | 24 | 0 | 0 | 96 |
| 97 | 20 | 2 | 8 | 20 | 8 | 9 | 21 | 2 | 10 | 21 | 8 | 11 | 22 | 2 | 12 | 22 | 8 | 13 | 23 | 2 | 14 | 23 | 8 | 15 | 24 | 3 | 0 | 97 |
| 98 | 20 | 5 | 0 | 20 | 11 | 2 | 21 | 5 | 4 | 21 | 11 | 6 | 22 | 5 | 8 | 22 | 11 | 10 | 23 | 5 | 12 | 23 | 11 | 14 | 24 | 6 | 0 | 98 |
| 99 | 20 | 7 | 8 | 21 | 1 | 11 | 21 | 7 | 14 | 22 | 2 | 1 | 22 | 8 | 4 | 23 | 2 | 7 | 23 | 8 | 10 | 24 | 2 | 13 | 24 | 9 | 0 | 99 |
| 100 | 20 | 10 | 0 | 21 | 4 | 4 | 21 | 10 | 8 | 22 | 4 | 12 | 22 | 11 | 0 | 23 | 5 | 4 | 23 | 11 | 8 | 24 | 5 | 12 | 25 | 0 | 0 | 100 |

# LINTELS OF INDIANA LIMESTONE

***Safe Uniformly Distributed Loads in Pounds per Inch in Width and Spans of Lintels***

| SPAN IN FEET | HEIGHT OF LINTELS IN FEET AND INCHES | | | | | | | | | | | | | SPAN IN FEET |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0-2″ | 0-4″ | 0-6″ | 0-8″ | 0-10″ | 1′-0″ | 1′-2″ | 1′-4″ | 1′-6″ | 1′-8″ | 1′-10″ | 2′-0″ | 2′-2″ | |
| | WEIGHT OF LINTELS IN POUNDS PER INCH WIDTH AND EACH FOOT OF SPAN | | | | | | | | | | | | | |
| | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | |
| | SAFE SUPERIMPOSED LOADS IN POUNDS FOR SPANS OF LINTELS PER 1″ WIDTH | | | | | | | | | | | | | |
| 1 | 46 | 188 | 426 | 760 | 1190 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 |
| 2 | 20 | 88 | 204 | 368 | 580 | 840 | 1148 | 1504 | 1908 | ..... | ..... | ..... | ..... | 2 |
| 3 | 10 | 52 | 126 | 232 | 370 | 540 | 742 | 976 | 1242 | 1540 | 1870 | 2232 | 2626 | 3 |
| 4 | 4 | 32 | 84 | 160 | 260 | 384 | 532 | 704 | 900 | 1120 | 1364 | 1632 | 1924 | 4 |
| 5 | ..... | 18 | 56 | 114 | 190 | 286 | 400 | 534 | 688 | 860 | 1052 | 1262 | 1492 | 5 |
| 6 | ..... | 8 | 36 | 80 | 140 | 216 | 308 | 416 | 540 | 680 | 836 | 1008 | 1196 | 6 |
| 7 | ..... | ..... | 20 | 54 | 101 | 163 | 238 | 327 | 429 | 546 | 676 | 819 | 977 | 7 |
| 8 | ..... | ..... | 6 | 32 | 70 | 120 | 182 | 256 | 342 | 440 | 550 | 672 | 806 | 8 |
| 9 | ..... | ..... | ..... | 13 | 43 | 84 | 135 | 197 | 270 | 353 | 447 | 552 | 667 | 9 |
| 10 | ..... | ..... | ..... | ..... | 20 | 53 | 95 | 147 | 209 | 280 | 361 | 451 | 551 | 10 |
| 12 | ..... | ..... | ..... | ..... | ..... | ..... | 28 | 64 | 108 | 160 | 220 | 288 | 364 | 12 |
| 14 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 26 | 63 | 107 | 158 | 215 | 14 |
| 16 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 48 | 91 | 16 |

***For any Given Width of Lintel, Multiply Loads Given, by Width of Lintel in Inches***

| SPAN IN FEET | HEIGHT OF LINTELS IN FEET AND INCHES | | | | | | | | | | | | | SPAN IN FEET |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2′-4″ | 2′-6″ | 2′-8″ | 2′-10″ | 3′-0″ | 3′-2″ | 3′-4″ | 3′-6″ | 3′-8″ | 3′-10″ | 4′-0″ | 4′-6″ | 5′-0″ | |
| | WEIGHT OF LINTELS IN POUNDS PER INCH WIDTH AND EACH FOOT OF SPAN | | | | | | | | | | | | | |
| | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 | 48 | 54 | 60 | |
| | SAFE SUPERIMPOSED LOADS IN POUNDS FOR SPANS OF LINTELS PER 1″ WIDTH | | | | | | | | | | | | | |
| 4 | 2240 | 2580 | 2944 | 3332 | 3744 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 4 |
| 5 | 1742 | 2010 | 2298 | 2604 | 2930 | 3276 | 3640 | 4024 | 4426 | ..... | ..... | ..... | ..... | 5 |
| 6 | 1400 | 1620 | 1856 | 2108 | 2376 | 2660 | 2960 | 3276 | 3608 | 3956 | 4320 | 5508 | ..... | 6 |
| 7 | 1148 | 1333 | 1531 | 1744 | 1970 | 2209 | 2463 | 2730 | 3011 | 3305 | 3614 | 4621 | 5751 | 7 |
| 8 | 952 | 1110 | 1280 | 1462 | 1656 | 1862 | 2080 | 2310 | 2552 | 2806 | 3072 | 3942 | 4920 | 8 |
| 9 | 793 | 930 | 1077 | 1235 | 1404 | 1583 | 1773 | 1974 | 2185 | 2407 | 2640 | 3402 | 4260 | 9 |
| 10 | 661 | 780 | 909 | 1047 | 1195 | 1353 | 1520 | 1697 | 1883 | 2079 | 2285 | 2959 | 3720 | 10 |
| 12 | 448 | 540 | 640 | 748 | 864 | 988 | 1120 | 1260 | 1408 | 1564 | 1728 | 2268 | 2880 | 12 |
| 14 | 280 | 351 | 430 | 515 | 607 | 706 | 811 | 924 | 1043 | 1170 | 1303 | 1743 | 2246 | 14 |
| 16 | 140 | 195 | 256 | 323 | 396 | 475 | 560 | 651 | 748 | 851 | 960 | 1323 | 1740 | 16 |
| 18 | 19 | 60 | 107 | 159 | 216 | 279 | 347 | 420 | 499 | 583 | 672 | 972 | 1320 | 18 |
| 20 | ..... | ..... | ..... | 14 | 58 | 106 | 160 | 218 | 282 | 350 | 422 | 670 | 960 | 20 |

Average Weight of Indiana Limestone, 144 pounds per cubic foot. Weights of Lintels have been deducted. Factor of safety, 8 to 10. Safe uniformly distributed superimposed loads are for *each inch width* of lintels.

# ADMONITION

The Indiana Limestone Institute has found, over a long and wide experience, that much dissatisfaction and disappointment can be avoided if proper care is used to see that masonry walls under construction are fully and securely protected against the infiltration of water, caused either by storms or water used in other phases of construction.

Unfortunately it has been found all too frequently that this care has been lacking, with the result that water which has been allowed to enter the walls becomes captive and, mixing with the soluble alkali salts usually found in masonry mortars, creates a chemical reaction which results in this moisture being drawn to the face of the wall by capillary attraction and leaving a deposit of unsightly efflorescence and/or staining of the stone. This applies not only to Indiana Limestone but to practically any type of masonry construction.

The Institute therefore urges all concerned to see to it that walls are kept dry during construction. This can usually be done at very small cost, but its observance will return large dividends in satisfaction.

# THE CLEANING OF INDIANA LIMESTONE

The Indiana Limestone Institute is the recipient of frequent inquiries as to the best methods to be used.

It is not possible or prudent to think that one single method can be successfully used to take proper care of all of these inquiries.

The age of the building, its location, the atmospheric conditions existent and the density of surface grime are all factors requiring study and consideration.

Up to the present time it has been found that there are two methods of cleaning Indiana Limstone which have apparently been used with a considerable measure of success.

One of these is known as the "Wet Aggregate Method" which is an application of water at low pressure to which is added a soft abrasive material, the theory being that the soft abrasive material loosens the dirt and grime and the water carries it away. This method does no damage to the stone or the finish, but does leave it clean and fresh looking.

Another method is known as the "Hydro-Air Method" and consists of a water application at high pressure mixed with compressed air, the theory here being that the air driven with force will loosen the dirt and grime upon contact and the water will carry them away.

It is the belief of the Indiana Limestone Institute that the use of acids be avoided, as there is too much likelihood of damage to the stone through its use.

The use of ordinary sand-blasting is not recommended because its sharp action tears the surface, sometimes to the extent of destroying the finish of the stone.

Furthermore, it has been our experience that the use of ordinary sand-blasting as a cleaning medium leaves the stone so roughened that it will quickly gather and retain atmospheric dirt and grime infinitely more rapidly than before.

# ABOUT THE DETAIL PLATES

The technical material offered in the following plates has been developed for the purpose of showing new applications of Indiana Limestone for the experienced architectural designer and to simplify a study of the use of this fine building material by new designers. The texts accompanying the detail plates explain the pertinent points illustrated, plate by plate.

It is not the intent that this book be considered as an attempt at architectural or structural design. Rather, its purpose is to show how Indiana Limestone should technically be used in architecture to attain the most economical and satisfactory results. Methods of supporting and anchoring stone have been stressed throughout, since it is realized that these problems are probably the most commonly faced in contemporary design. No steel or anchor sizes are given as they will vary with each design. However, for the architects' use in designing the structural steel to carry the stone and to determine anchor sizes, it is recommended that the weight of the stone be figured at 144 lbs. per cubic foot. The term non-corrosive, when used in connection with anchors, refers to metals such as brass, bronze, stainless steel and Eraydo Zinc; the last named being a low-cost, strong and very effective metal.

The average crushing strength of Indiana Limestone is conservatively 4000 lbs. per square inch. It is suggested that a figure of not over 2500 lbs. per square inch is ample as a specification requirement for crushing strength, and it certainly provides an ample factor of safety. Specification requirements greater than this approach the impractical. They tend to increase costs out of all proportion to the value received by the purchaser, due to the increased selection and extra handling required at the quarries to meet such requirements. Obviously, it would be impossible to anticipate and include in this book every conceivable condition that might arise. But the points covered in the various plates and texts can readily be adapted to specific problems for a solution.

From time to time a very frequent inquiry received from Architects and Contractors is by what means Indiana Limestone is supported while being set. This is done by pin lewises

inserted in lewis holes in the top of the stone. It is standard practice for the cut stone contractor to drill these holes at the required converging angle so that a clamping action results, permitting the stone to be easily hoisted into place. In the case of heavy stones of small horizontal sectional area, such as columns, etc., box lewises are used and, as in the case of pin lewises, special holes are cut for these by the cut stone contractor.

Throughout the texts and plates frequent reference is made to various commercial items such as special anchoring devices, insulation, etc. By these references, the object is to show by new ideas of construction, a wider range of applications for Indiana Limestone. Such items mentioned should be interpreted as suggestions only of types of items that can possibly be used but should not be taken as an indorsement of specific items per se.

The designer should not blindly accept the use of any items suggested without his own investigations as to the feasibility of their use in his particular application. He should establish to his own satisfaction, through the recommendations and guarantees of the manufacturers of special items referred to, the quality of the products and the advisability of their use for their applications in his design. Full design information should be obtained from the manufacturers.

The following is a reference list of special commercial items mentioned throughout the texts and plates:

1. Ring Wedge Anchors—"Cinch," "Star-Slugin" or equal.
2. Toggle Bolts—"Star-Snapin" or equal.
3. Powder Driven studs—"Remington," "Drive-it," "Ramset" or equal.
4. Thru Walls Flashing—"Anaconda thru-wall," "Revere, 3-way bond thru-wall," "Chase 3-way bond thru-wall," "Hussey 3-way bond thru-wall," "Cheney 3-way bond thru-wall" or equal.
5. Joint Expansion Gaskets—"Grund" or equal.
6. Joint covers—"Minwax Weathercap," "Perfection" or equal.
7. Rigid Type Insulation—"Foamglas," "Insulrock" or equal.

# PLATE NO. 1

The two designs show applications of Indiana Limestone for curtain wall design whereby expensive and heavy masonry backing is eliminated. Thus great economy is attained not only by the elimination of the backing, but also in the great saving that can be made by the lighter steel and concrete structure that is required throughout the entire building. Time in erection, and valuable rental or utilitarian space are saved.

The owner has the advantage of the low original cost of Indiana Limestone, its natural beauty, its permanence and of its low maintenance cost as a facing material. The soft color tones of Indiana Limestone blend well with the natural colors of stainless steel or aluminum trim or they offer perfect contrasts when the trim is coated with well-selected brilliant colors.

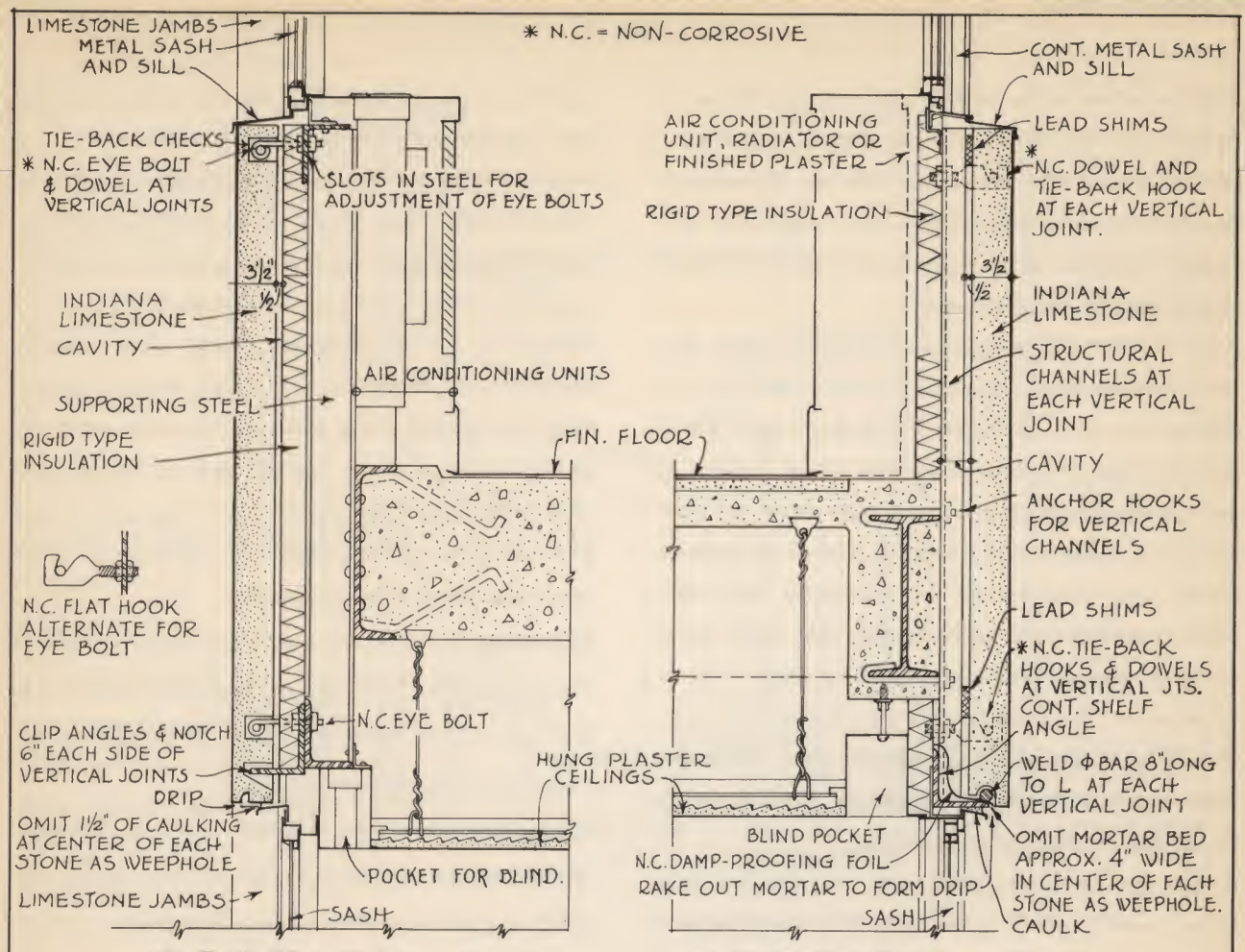
Plain ashlar treatments such as shown in both designs lend themselves to mass production which is reflected in low cost.

In section A-A, the stone is carried on intermittent clip angles at each vertical joint located up from the soffit of the stone to avoid exposure of the supporting steel to view. This is sometimes considered desirable by designers. However, it should be noted that this creates a more difficult setting condition than would exist if the supporting steel shelf is located at the soffit where the stone can be bedded on the steel.

By the use of the rigid type insulation shown, the same insulating value is attained as to equal that of a thick conventional masonry wall. This insulation is a type such as "Foamglas" or equal, installed as per manufacturer's specifications, after the stone is set.

Due to the many different building codes in effect in various communities, the architect must adapt and alter the suggestions shown in this plate to local code requirements. It would be virtually impossible to include in a series of plates of this kind only designs that would not in some manner conflict with some clause of a local code. It should be noted that in the use of these plates and texts, as a reference by the architect, the purpose is to give suggestions of designs that incorporate the use of Indiana Limestone. By its use in each design, the object is to show how it can be used with other commercial items so as to lower the overall cost of a building by new ideas of construction. Where the names of products other than Indiana Limestone, such as insulation, special types of anchors, etc., are listed, it is done to show types of items that can conceivably be used in these new ideas of design and construction.

The designer must establish to his own satisfaction, by drawing on his own experience, by his own investigations with the manufacturers of special items referred to or by independent tests, the quality of the products and the advisability of using any particular item shown for a particular application. The architect must assume full responsibility for the use in his drawings of any items referred to in these plates and texts. It is not presumed that products and methods mentioned are the only ones that can be used to obtain certain results.

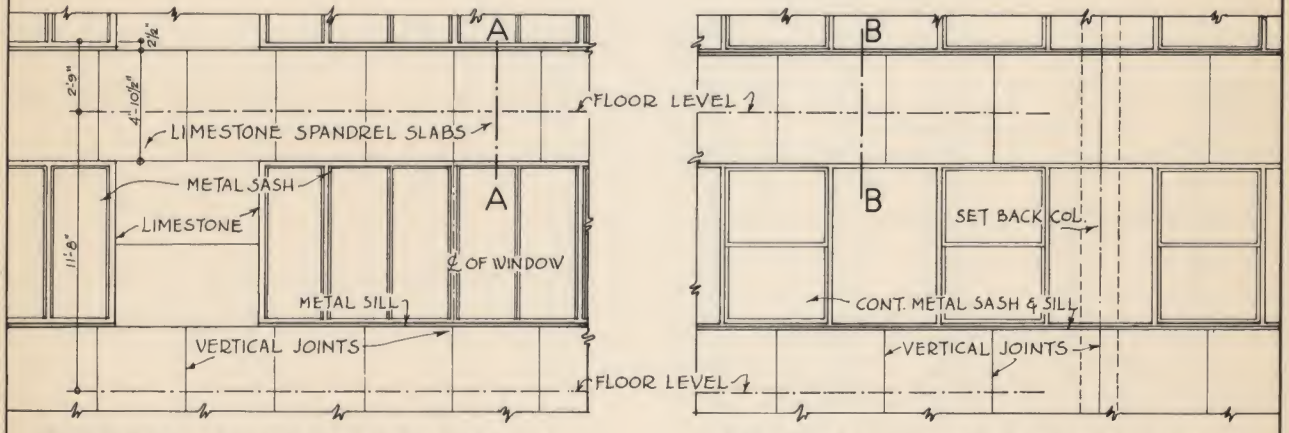



## SECTION A-A

SCALE 3/4" = 1'-0"

## SECTION B-B

SCALE 3/4" = 1'-0"




## DESIGN ELEVATION NO. 1

SCALE 1/8" = 1'-0"

## DESIGN ELEVATION NO. 2

SCALE 1/8" = 1'-0"

KEY TO MATERIALS } LIMESTONE CONCRETE METAL INSULATION LEAD

# SPANDREL DETAILS

PLATE Nº 1

# PLATE NO. 2

With the advent of the modern trend for new designs of curtain walls which eliminate heavy masonry construction, some architects have lost sight of the fact that Indiana Limestone is just as adaptable to new design as to old. Its soft color tones blend perfectly with metal trim such as stainless steel and aluminum.

It is a "free stone" being free of cleavage planes that would cause it to split or exfoliate as do other types of sedimentary rock. It is highly fire resistant, yet it has a low coefficient of thermal expansion. These qualities in conjunction with its comparatively high degree of elasticity as a masonry material, make it ideal for exterior facing. Such characteristics are noteworthy when compared with flashy but brittle facings that crack easily under thermal stresses which would not affect Indiana Limestone.

The designer can use this Limestone with confidence, knowing that its beauty and weathering qualities cannot be equaled by an imitation material.

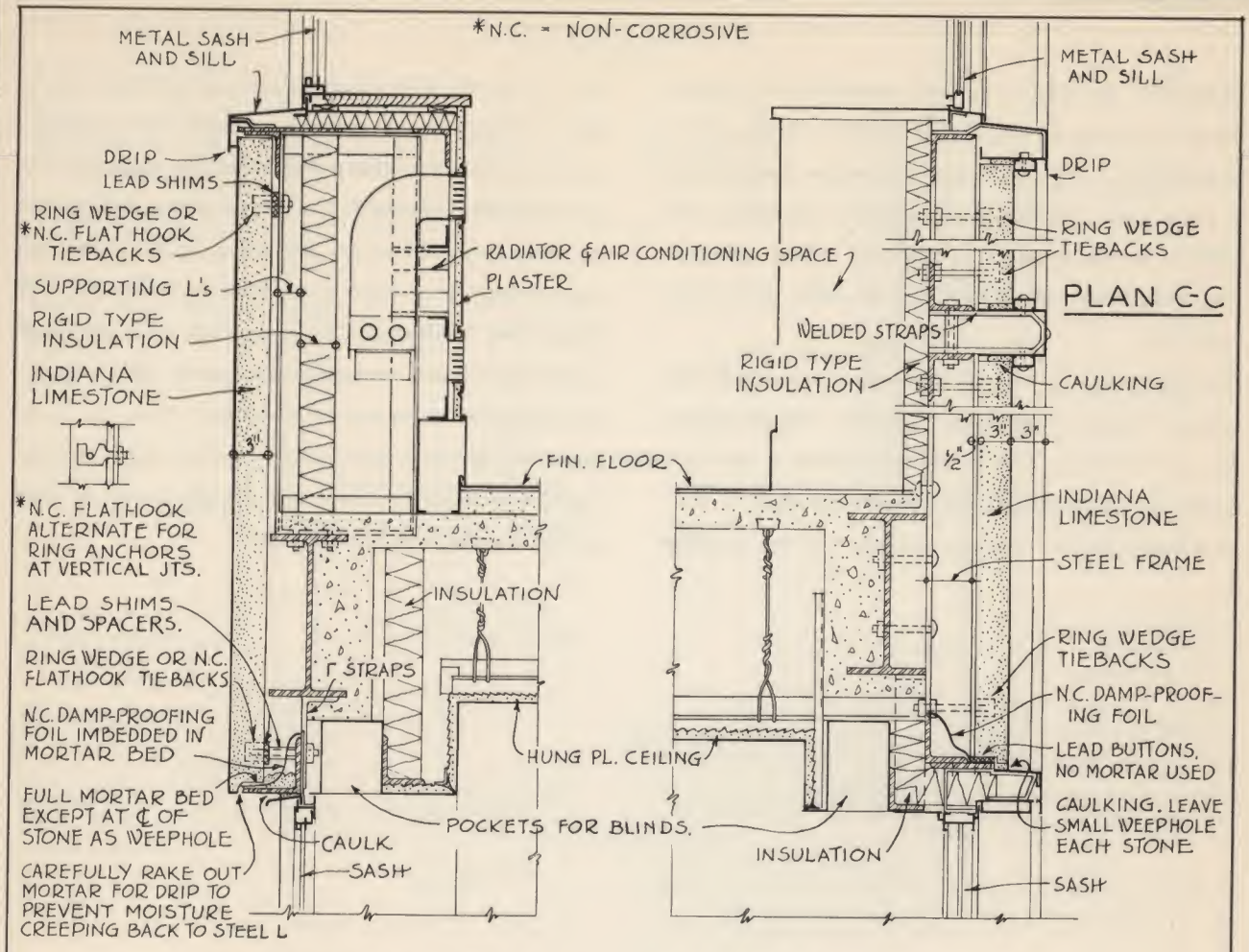
Designs such as shown on this plate, where the limestone facing consists entirely of flat retangular slabs, make it possible for the ashlar units to be produced on a mass basis. Naturally, this is reflected in low initial cost.

The ring-wedge anchors referred to are commercial items such as "Cinch," "Star-Slugin" or equal. Design information which will give correct sizes and types for a particular application is available from the manufacturers.

Design No. 4 is of particular interest since it shows Limestone used entirely as a dry wall material with no mortar whatsoever being required. The stone slabs are merely bolted in place, caulked and framed by neat removable metal strips. The horizontal and vertical lines give it a clean cut look. Numerous different treatments can be conceived from this design.

Both design No. 3 and No. 4 have the insulating value of a heavy masonry wall. The rigid-type insulation shown is a kind such as "Foamglas" or equal installed as per manufacturer's specifications.

Great differences in local building codes in various communities make it imperative that the architect adapt these design suggestions to local code requirements.

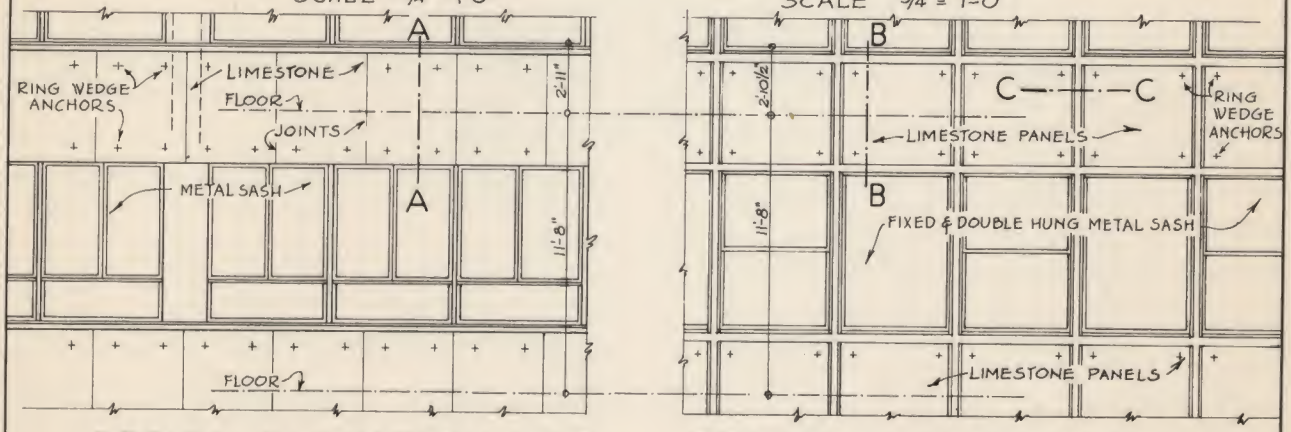



## SECTION A-A

SCALE 3/4" = 1'-0"

## SECTION B-B

SCALE 3/4" = 1'-0"




## DESIGN ELEVATION NO. 3

SCALE 1/8" = 1'-0"

## DESIGN ELEVATION NO. 4

SCALE 1/8" = 1'-0"

KEY TO MATERIALS } LIMESTONE | CONCRETE | METAL | INSULATION | LEAD

INDIANA LIMESTONE INSTITUTE

# SPANDREL DETAILS

PLATE Nº 2

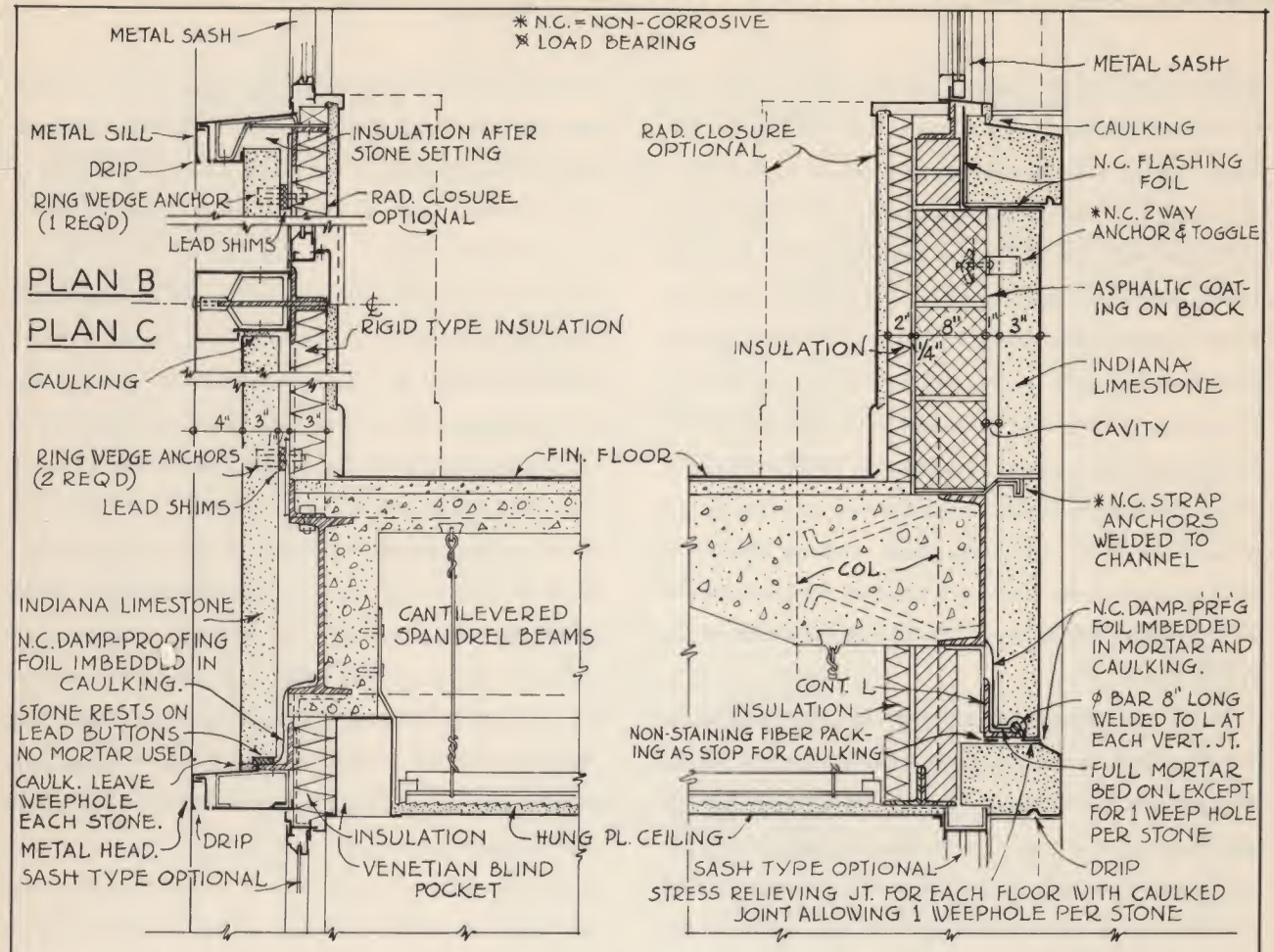
# PLATE NO. 3

Design No. 5 shows a dry wall application of Indiana Limestone facing similar to that shown in design No. 4 of plate No. 2. No mortar is used, the stone being bolted in place and caulked. Stainless steel or aluminum trim forms a frame around the individual ashlar spandrels and these metals blend well with the color tones of the limestone.

The ring-wedge anchors referred to are commercial items such as "Cinch," "Star-Slugin" or equal. Design information that will give correct sizes and types for a particular application is available from the manufacturers.

As is true in the thin curtain wall designs, shown on plates No. 1 and No. 2, the incorporation of rigid-type insulation in design No. 5 gives this wall the same insulating value as that of a heavy and expensive masonry wall. The insulation referred to is of a type such as "Foamglas" or equal, installed as per the manufacturer's specifications. Design No. 6 shows a modified masonry curtain wall where the architectural designer might find that local code requirements necessitate this type of construction.

As mentioned in the text for Plates No. 1 and No. 2, the great differences in local building codes make it essential for the architect to adapt any designs shown in these plates to local code requirements.

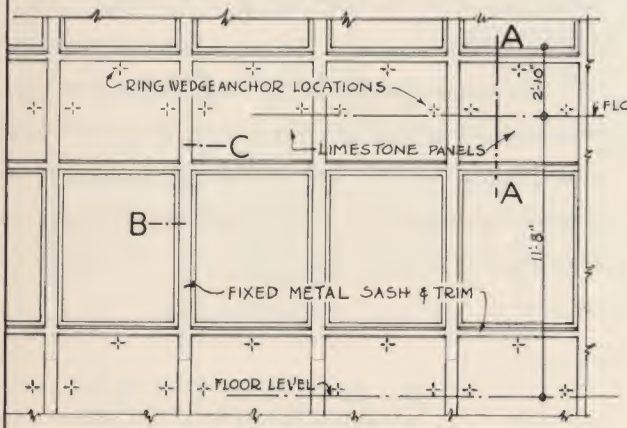



## SECTION A-A

SCALE 3/4" = 1'-0"

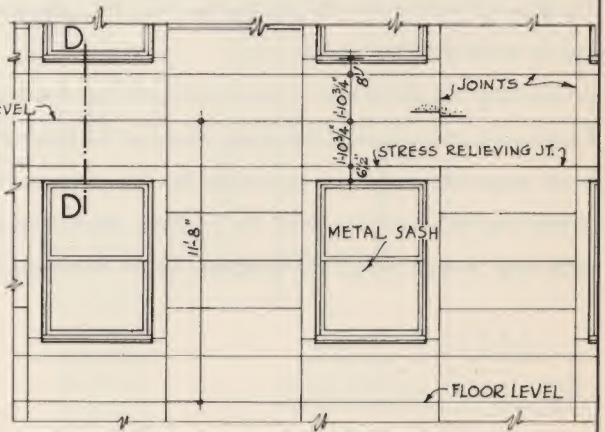
## SECTION D-D

SCALE 3/4" = 1'-0"




## DESIGN ELEVATION NO. 5

SCALE 1/8" = 1'-0"




## DESIGN ELEVATION NO. 6

SCALE 1/8" = 1'-0"

KEY TO MATERIALS: LIMESTONE, CONCRETE, BRICK, ⊗ L.B. BLOCK, INSULATION, METAL, LEAD

INDIANA LIMESTONE INSTITUTE

# SPANDREL DETAILS

PLATE NO 3

# PLATE NO. 4

Where conventional masonry construction is used for multi-storied buildings with regular brick backing for the stone, Section A-A shows a very economical wall section. It is excellent construction. Supporting shelf angles are eliminated and the wall bears directly on the building frame, each story carrying itself. The pressure relieving joints suggested are simple in design relieving excessive compressive stresses on the wall below and provide for thermal movements and wind sway for high buildings.

Where caulking is used in the pressure relieving beds, it can be colored to match the mortar tuck pointing in the other stone joints. Only top grade caulking should be used and before the caulking is applied, the joints should be thoroughly primed as per the caulking manufacturer's specifications.

If commercial pressure-relieving devices are installed in the stone beds, guarantee of the effectiveness and results of their use should clearly be the responsibility of the device manufacturer and not the responsibility of the cut stone contractor or the stone setter. The designer should establish to his own satisfaction by the assurances of the manufacturer that such items will not injure the stone, causing spalling of the joint edges, etc.

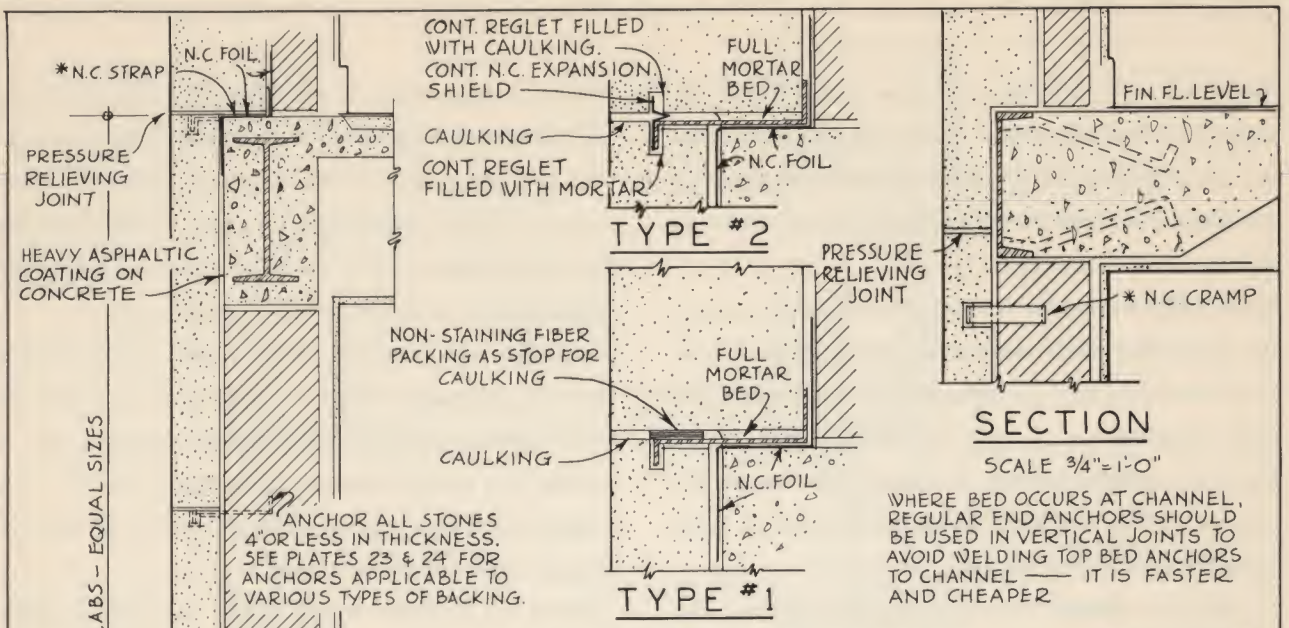
The bonding shown may vary in various localities depending on local building codes.

All backing should be laid in non-staining cement mortar. Parging the entire back of the stone, ahead of the backup, is an expensive and slow operation for the purpose of preventing stone staining from the backing. Many architects and masons advocate parging, but a much more economical way to accomplish the same result is to eliminate the parging and, as the stone is backed up by the brick, to fill thoroughly the space between the back of the stone and the brick with non-staining cement mortar as each brick is laid.

Masonry walls under construction should be thoroughly protected from rain at all times by such means as heavy tarpaulin covers, etc. Water entering the wall will dissolve staining salts from the backing and as the wall dries out the tendency is for this water to be drawn to the outside stone facing where it evaporates. The staining salts do not evaporate but are left deposited in the tiny surface pores as brown stain or as white efflorescence. Water should never be permitted to wash off concrete floor slabs or beams down onto the stone below, for raw, uncoated concrete is the worst source of staining salts. Water, from plumbing that has developed leaks in old buildings, can be the cause of staining and efflorescence if it reaches and saturates the outside walls.

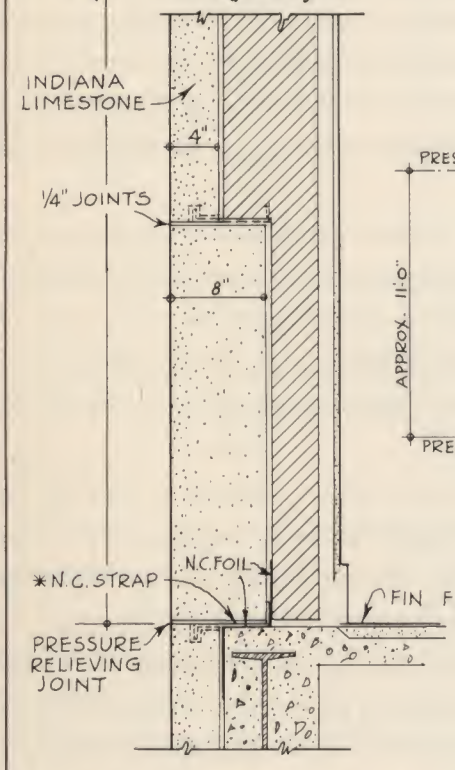
A recommendation for the use of cramp anchors in the end joints of ashlar is shown as the practical way to anchor stone where the top bed occurs at a beam level. End cramps are effective and easily installed.

In the section for Random Ashlar, it is strongly recommended that dimension "X" be made to equal dimension "Y". This permits the bonding of the stone facing to work more logically with hollow tile or concrete block or with brick backing. Where frame backing is used and no bonding is required, it is of no particular advantage for dimension "X" to equal dimension "Y".









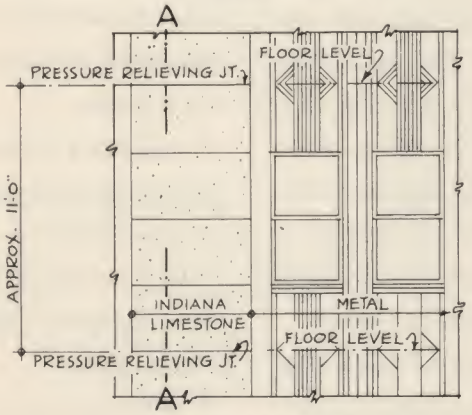

## SECTION A-A

SCALE 3/4" = 1'-0"

CORBEL EFFECT OF CONSTRUCTION IS UTILIZED TO ELIMINATE SUPPORTING SHELF ANGLES.

## SUGGESTIONS FOR PRESSURE RELIEVING JOINTS

SCALE 1 1/2" = 1'-0"




## ELEVATION

SCALE 1/8" = 1'-0"

## KEY TO MATERIALS

* N.C. = NON-CORROSIVE

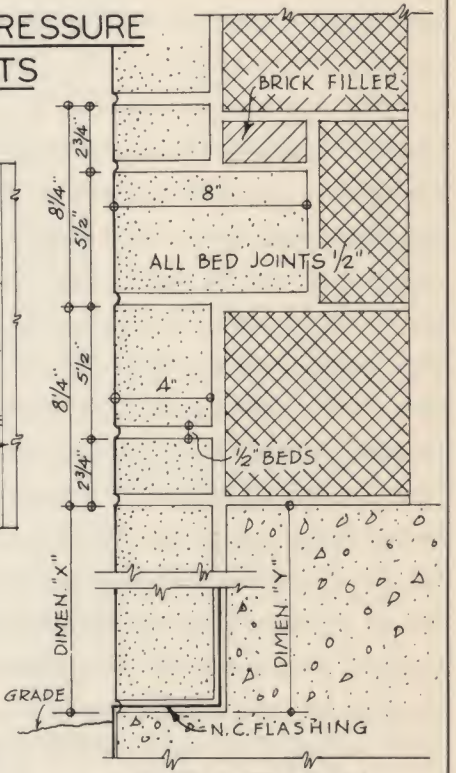
LIMESTONE

CONCRETE

BRICK

TILE OR CONC. BLOCK

METAL




## SECTION RANDOM ASHLAR

SCALE 1 1/2" = 1'-0"

RECOMMENDED FOR RANDOM ASHLAR FACING WHERE BONDING WITH TILE OR CONC. BLOCK. DIMENSION "X" SHOULD EQUAL DIMENSION "Y".

# WALL SECTIONS

PLATE No 4

# PLATE NO. 5

Suggested uses of Indiana Limestone that will give the owner all of the advantages of the low cost, the beauty and the permanence of this proven material are shown on this plate. The stone blends perfectly with aluminum or stainless steel window trim.

These designs show the feasibility of Indiana Limestone for school and office construction at low original cost. They also assure low maintenance cost in comparison with other materials.

Numerous different designs of similar types can be developed by the architect, taking the methods of stone applications shown as a basis.

In these two designs, expensive masonry backing has been simplified in the first and eliminated entirely in the second, below the metal sill.

In Section A-A it will be noted that by cavity wall construction, it is possible for the cinder block to be laid and the limestone facing to be set later. The cavity, the asphaltic coating on the cinder block and on the concrete footing, also, the flashing below the facing, eliminate to a great degree the possibility of staining of the stone from the cement in the backing and the footing.

Note that the walk or grade should have sufficient slope for quick run-off of rain water away from the building.

Where powder driven studs are suggested for attaching anchors to the backing, this refers to a method whereby the anchor is held in place and a stud is literally shot through the anchor and into the backing by a special type gun. Several such guns are available such as manufactured by the Remington Arms Co., Powder Power Tool Corporation and Ramset Division of Olin Industries, Inc. It should be realized that all types of backing are not suitable for such a method, particularly hard and brittle brick or concrete. The Gun manufacturers should be consulted for correct applications, such as type of backing, minimum edge distances, etc. Where it is feasible to use powder driven studs, it is a fast and easy method to use. The ring-wedge anchors referred to are commercial items such as "Cinch," "Star-Slugin" or equal. Design information that will give correct sizes and types for a particular application is available from the manufacturers.

The toggle bolt shown is a "Star Snapin" or equal and it provides an easy method for attaching an anchor to cinder block or hollow tile backing, requiring only a drilled hole through the outer web of the backing. The toggle bolt is then inserted and tightened snugly against the upturned arm of the anchor.

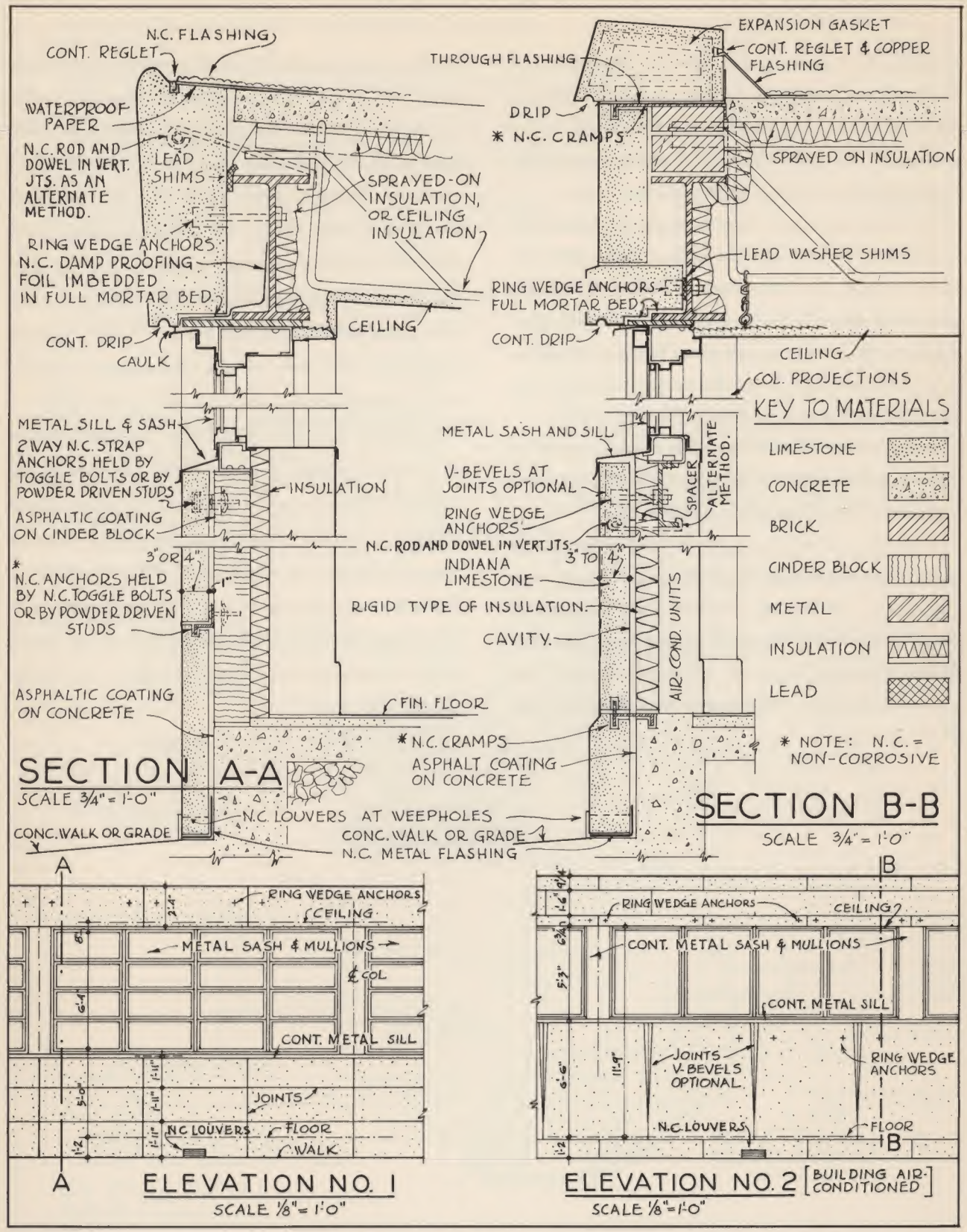
Section B-B illustrates a very simple but effective wall, having the insulating value of a heavy masonry wall. As noted, rigid type insulation is used with a cavity left between it and the back of the stone. This permits ventilation of the back of the stone and also it provides for a differential of thermal movement between the stone and the insulation.

This rigid type insulation, "Foamglas" or equal, should be used as per the manufacturer's specifications. The manufacturers should be consulted as to the various types of installations for which their products are applicable.

For a discourse on joint expansion gaskets in copings, see text for plate 14.

In section A-A the coping is designed to eliminate the possible washing of rain over the flashing and down the face of the stone. This prevents green copper oxide stain from discoloring the stone.

Note that ample drips on projecting stones and on the metal sills minimize the possibility of grime streaking the stone. The drips at the window heads prevent water from creeping back to the window frames. The Architectural drawings should clearly show all drips for they are definitely a design item.







ELEVATION NO. 1
SCALE 1/8" = 1'-0"




ELEVATION NO. 2 [BUILDING AIR-CONDITIONED]
SCALE 1/8" = 1'-0"

INDIANA LIMESTONE INSTITUTE

# ONE-STORY SCHOOL & OFFICE BUILDINGS

PLATE No 5

# PLATE NO. 6

Probably the most important thing to consider in the design of steps and cheeks is proper provision to minimize the possibility of water working into the backing and to provide for quick and immediate drainage if any water does penetrate in back of the facing stone.

This is particularly true in climates having numerous cycles of freezing and thawing in the winter. Water which becomes trapped and frozen back of steps or in the core of a cheek exerts a tremendous force from expansion. It will literally force steps and cheek facing out of place. If the stone is well anchored, the mechanical force of the trapped and frozen water can easily split the stone.

Since steps are subject to more water in heavy rains than are the vertical walls of a building, it is doubly important that careful thought be given to their design.

In section A', it will be noted that flashing through the mortar bed and through the drainage spots is shown as "Optional." The purpose of this flashing is to prevent moisture from being absorbed by the stone steps from the concrete slab below by capillary attraction. This would cause stain or efflorescence from the salts in the concrete. So long as no water penetrates to the concrete slab, there should be no condition to cause this trouble but since it is practically impossible to keep steps watertight at all times, we feel that it is better practice to provide the flashing. However, this is a point on which the designer must use his own judgment, weighing the possibility of moisture against the added cost of the flashing. It should be pointed out that many examples of steps exist where such flashing was not used and no staining has resulted. See plate 14 for a full discussion of obtaining good bond between flashing and the bed mortar.

The notes on this plate pertaining to "Suggested factors to consider in design" cover the points that wide experience has shown to be the ones most commonly faced. However, a single plate cannot possibly include all special conditions that might exist in different designs. Therefore, we cannot stress too much the importance of the designer taking into consideration all special factors which a particular design might present and to make provision for same.

## SUGGESTED FACTORS TO CONSIDER IN DESIGN

PROVISION —

1. . . OF EXPANSION JOINTS AT ENDS OF STEPS AND SUPPORTING SLAB TO PERMIT SETTLING AND THERMAL MOVEMENT WITHOUT INJURY TO CHEEKS. STEPS CAN THUS BE SET AS A FINAL OPERATION, THUS AVOIDING INJURIOUS CONSTRUCTION TRAFFIC OVER STEPS.
2. . . OF WEEPHOLES BELOW STEPS WITH PROPER DRAINAGE BELOW SUPPORTING SLAB TO AVOID MOVEMENT BY FROST ACTION.
3. . . FOR DRAINAGE OF CHEEKS BETWEEN FACING AND CONC. CORE BY WEEP LOUVERS TO ACCOMMODATE ANY POSSIBLE LEAKAGE OF JOINTS.
4. . . FOR DRAINAGE OF CHEEKS BY CAVITY DESIGN AND WEEP LOUVERS IF CHEEK CORES ARE BRICK.
5. . . OF THROUGH FLASHING BELOW CHEEK CAPS IF THEY ARE SO LONG AS TO REQUIRE BEING JOINTED INTO MORE THAN ONE PIECE.
6. . . FOR WATERPROOFING FACE OF ALL CONC. BACKING TO PREVENT STAINING OF STONE.
*7. . . OF SUFFICIENT N.C. DOWELS AND ANCHORS.

*NOTE: N.C. = NON-CORROSIVE

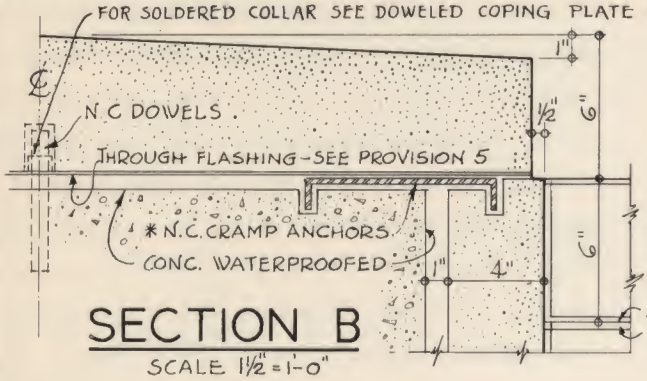
## KEY TO MATERIALS

LIMESTONE

CONCRETE

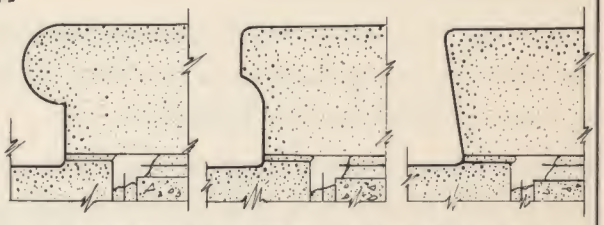
MORTAR

METAL



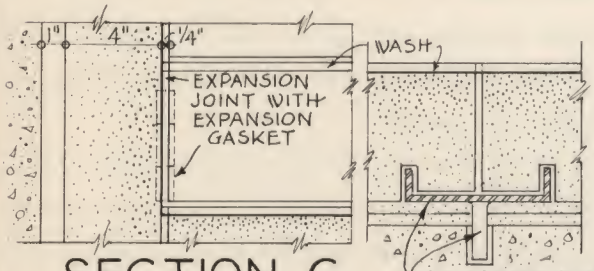

## SECTION B

SCALE 1½" = 1'-0"



## ALTERNATE NOSINGS

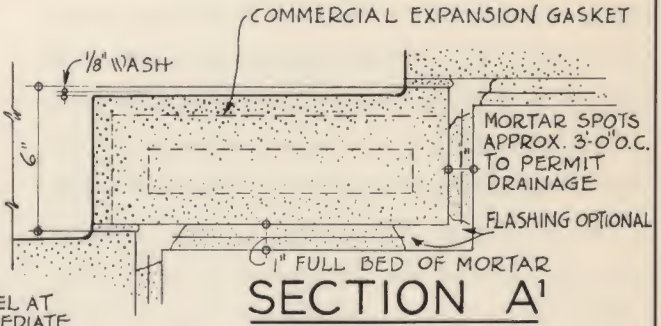
SCALE 1½" = 1'-0"




## SECTION C

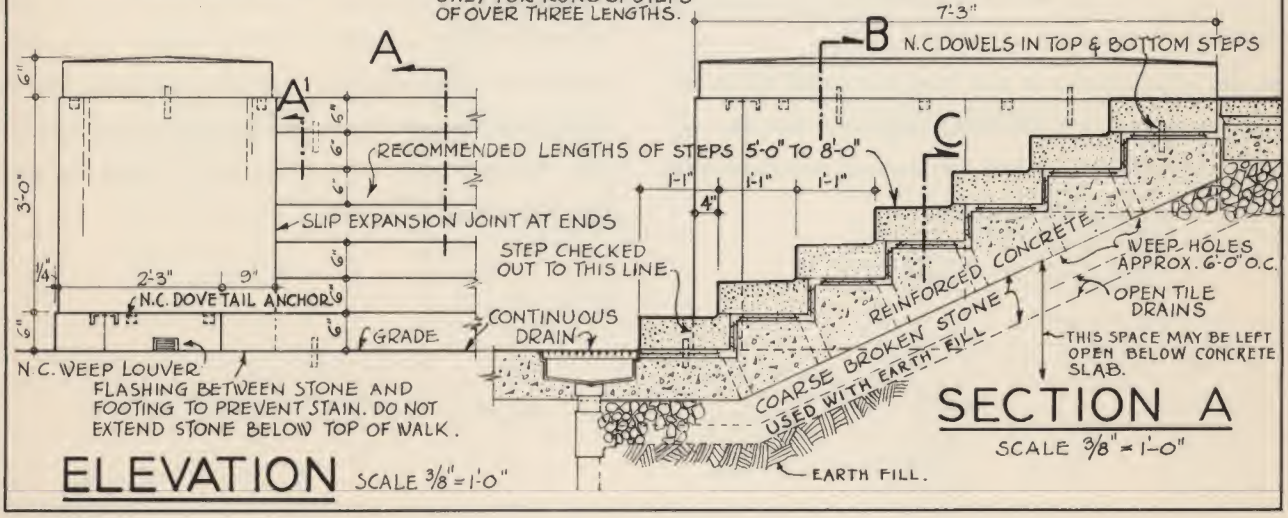
SCALE 1½" = 1'-0"

N.C. CRAMP-DOWEL AT JOINTS OF INTERMEDIATE STEPS. RECOMMENDED ONLY FOR RUNS OF STEPS OF OVER THREE LENGTHS.




## SECTION A¹

SCALE 1½" = 1'-0"




## ELEVATION

SCALE ⅜" = 1'-0"

## SECTION A

SCALE ⅜" = 1'-0"

INDIANA LIMESTONE INSTITUTE

# DETAIL OF STEPS

PLATE Nº 6

# PLATE NO. 7

This plate shows applications for the use of Indiana Limestone sills in conjunction with various types of metal sash. It is impossible to show designs to cover all of the many different sash that are available to the architectual designer. Rather, it is the purpose of this plate to indicate to the architect that Indiana Limestone can be cut to his detail to fit any metal sash and window frame that he might elect to use in his design.

Thus, it can be seen that the designer has unlimited possibilities when using Limestone for sills whether they be used in all-stone buildings or when used as trim.

Since cut Indiana Limestone is produced on a made-to-order basis to the architect's details, it is very essential that the cut stone company be furnished with complete full sized details showing the relationship of the sills to the sash or frame. This is especially true of any lips, reglets, or recesses that are required in the sills to properly fit with the sash. This also applies to stone jambs and lintels. It is of great help in the preparation of stone working drawings for the cut stone company to be furnished with the sash manufacturer's catalogue of details of sash being used. At least the cut stone contractor should be furnished with the name of the sash manufacturer and the type of sash used so that he can obtain necessary detail information from catalogues already in his file.

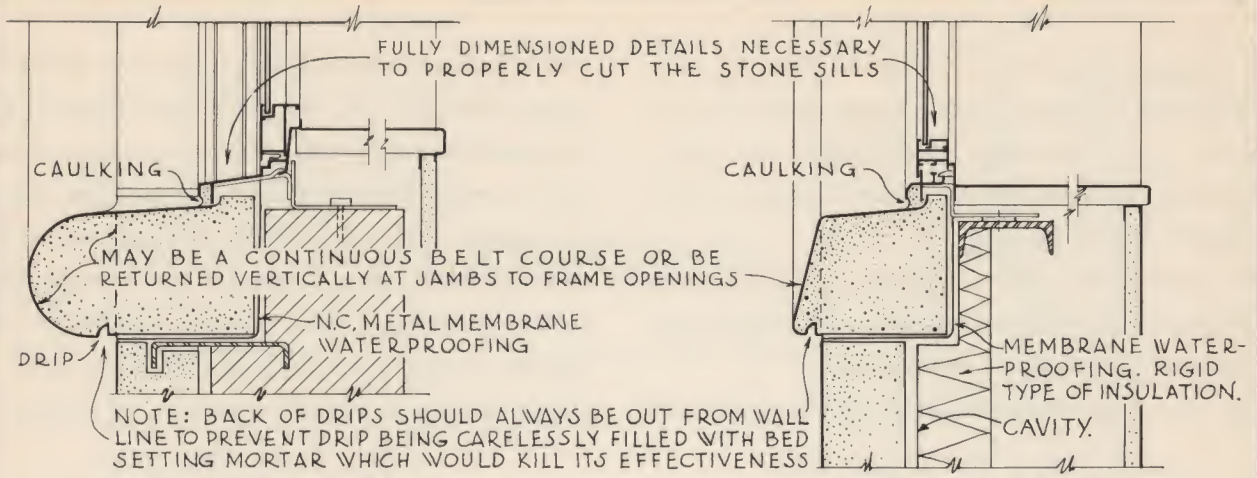
In case of substitution of sash from that called for on an original design, it is obviously necessary that the cut stone company be furnished with the sash manufacturer's details of actual sash to be used.

Of great importance, to avoid delay, is for the dimension showing the relationship of the sash to the wall line to be clearly shown. Quite often in details of sills, where the lip fits up under the sash, the height of the lip in proportion to its thickness is too great to be practical. When this is true, the lip might be fractured in machining with the result that it might later break off. Also, it might easily be broken in handling. Therefore, if the cut stone company makes recommendations for changes to strengthen the lip, such suggestions should be seriously considered by the architect as being made to follow good practice.

If stone sills are used as trim with brick facing, it is essential that the architect's details show correct dimensions for height that will work with the brick courses used.

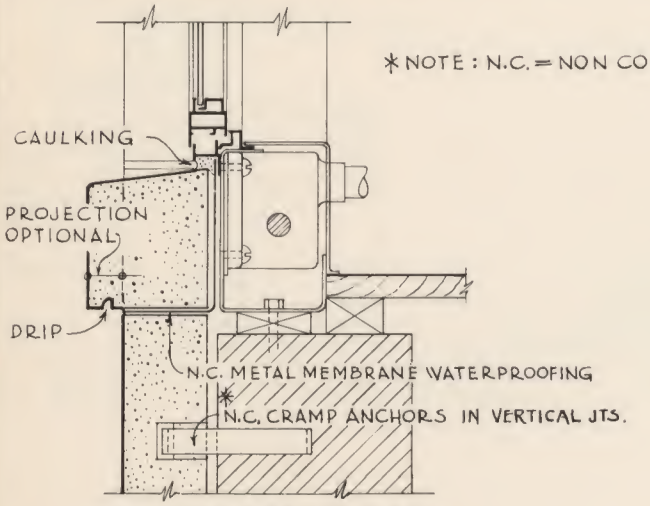
If basic information, dimensions, etc., are missing from the architect's original drawings, great delay is often experienced in the preparation and completion of the stone working drawings until this information is forthcoming. Also, incorrect information will result in the stone being cut improperly.

In setting stone sills, slip sills should be set in a full bed of mortar. In the case of lug sills, they should be bedded in mortar only at the ends, the bed joints being pointed when the balance of the tuck pointing is done on the completion of a building. If lug sills are set in a full bed of mortar, there is danger that they might snap at their center due to the slight but normal construction settling of the masonry window or door jambs at the ends of the sills. This settling would put an undue bending stress on the sill, causing it to break.

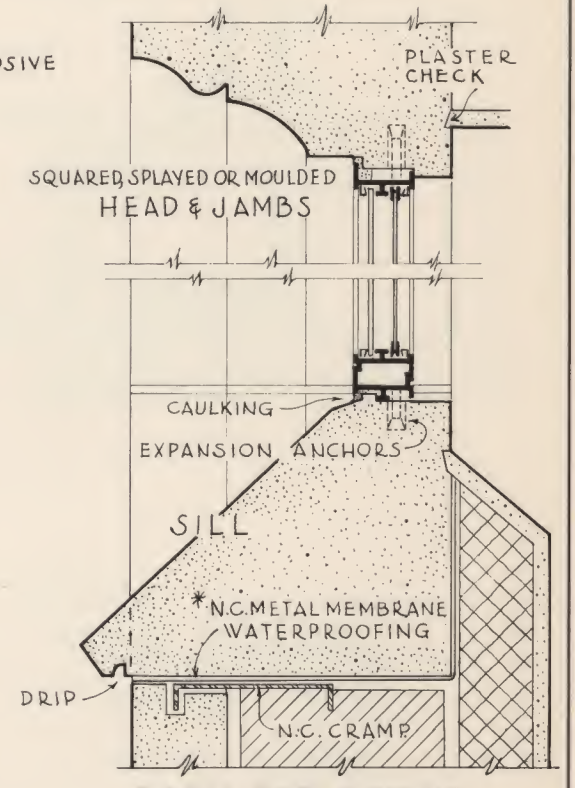



DOUBLE HUNG SASH

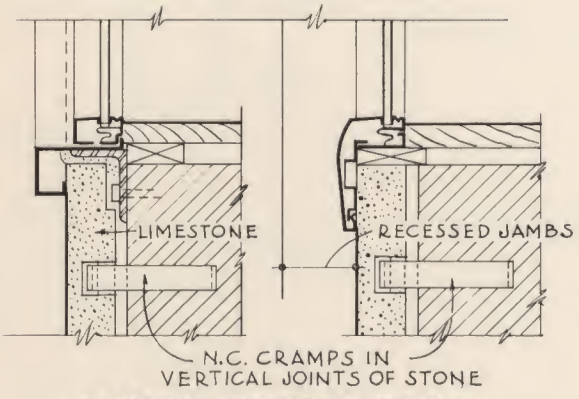
CASEMENT SASH




PROJECTED SASH




SASH FOR GOTHIC CHURCH WINDOWS




STORE FRONT SASH

SCALE 1½" = 1'-0"

KEY TO MATERIALS

| | | | |
|---|---|---|---|
| LIMESTONE | | INSULATION | |
| BRICK | | METAL | |
| FURRING TILE | | WOOD | |

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# SILL DETAILS FOR METAL SASH

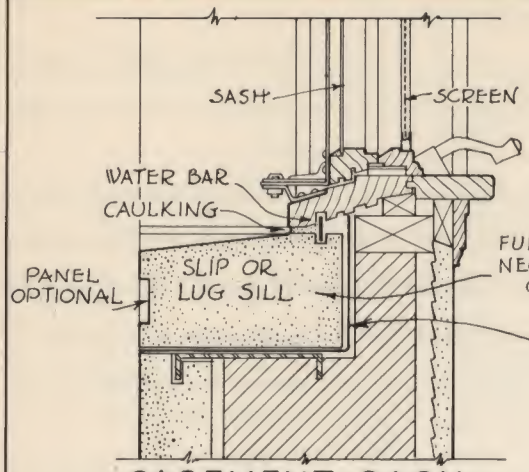
PLATE Nº 7

# PLATE NO. 8

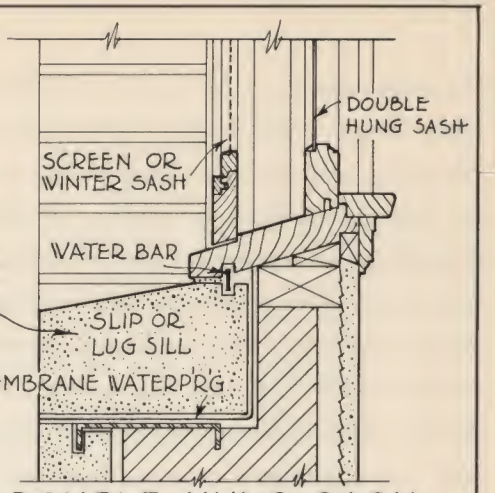
As in plate 7 the purpose of this plate is to show the wide adaptability of Indiana Limestone when used as sills. It can be cut to any size or shape to work with other materials, thus giving the architectural designer almost unlimited scope in his designs.

Although the sash and frames on this plate are wood, the same basic facts that pertain to the use of limestone with metal sash and frames also hold for wood.

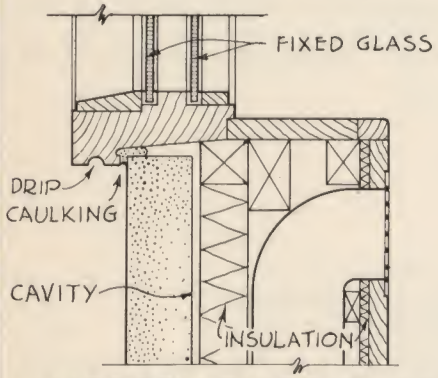
Too much stress cannot be placed on the necessity of complete sill information being given on the architect's original drawings. This will avoid long delays in the preparation and completion of the stone working drawings by the cut stone company. Since cut stone cannot be produced until the completion and approval of the stone working drawings, the importance of working information can be seen. For a complete discourse on the necessity of details, etc., also, for factors to consider in the setting of slip and lug sills, refer to the text for plate 7.



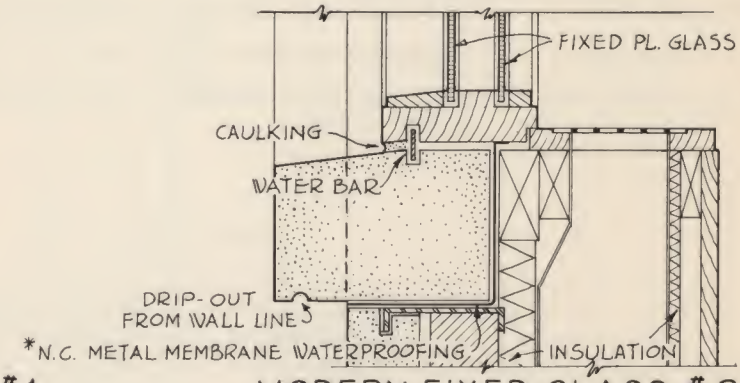

CASEMENT SASH



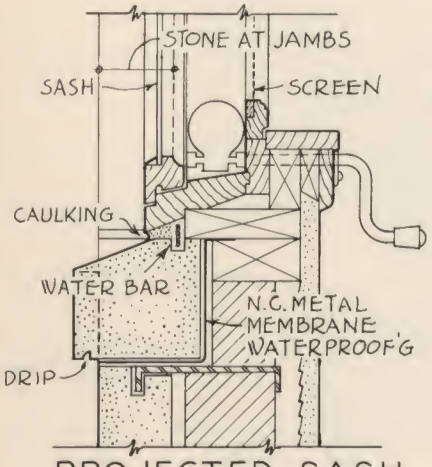

DOUBLE HUNG SASH




MODERN FIXED GLASS # 1




MODERN FIXED GLASS # 2




PROJECTED SASH

* NOTE: N.C. = NON-CORROSIVE

SCALE 1½" = 1'-0"

KEY TO MATERIALS

| | |
|---|---|
| LIMESTONE | |
| BRICK | |
| INSULATION | |
| METAL | |
| WOOD | |
| PLASTER | |

INDIANA LIMESTONE INSTITUTE

# SILL DETAILS FOR WOOD SASH

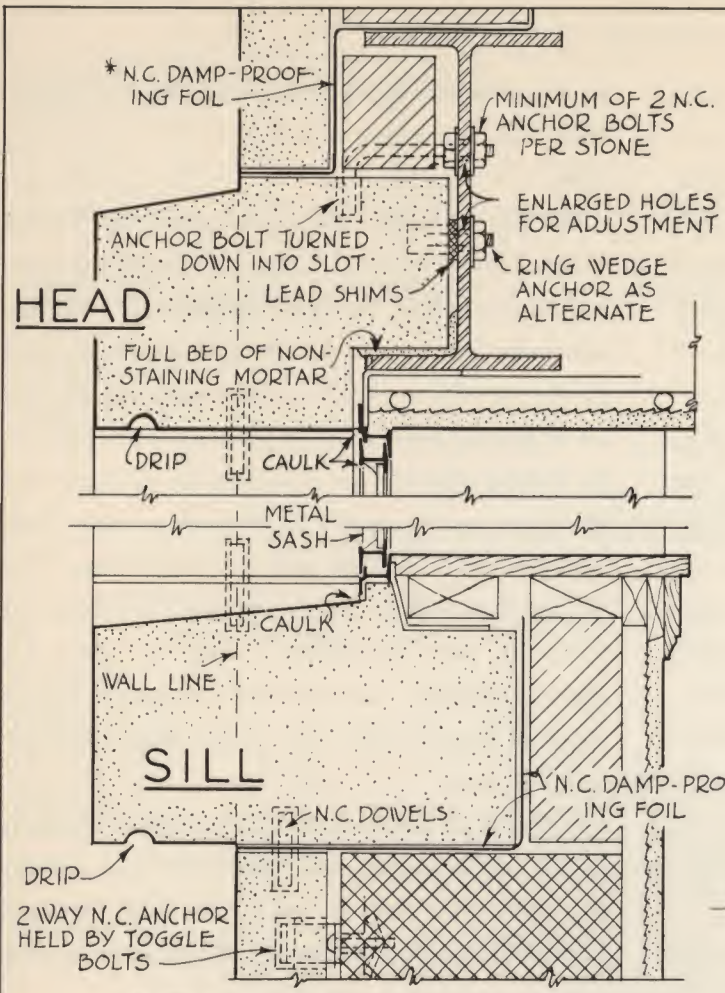
PLATE NO 8

# PLATE NO. 9

The window surround shown can be used either with stone ashlar facing, as illustrated, or as trim with brick facing. Too much stress cannot be placed on the importance of the architectural drawings showing full detailed and dimensioned information in order to avoid delay in the preparation of the necessary stone working drawings. Where metal sash is used, the cut stone company should be furnished with the sash manufacturer's dimensioned details in order to properly coordinate the stone with the sash. This is necessary so as to provide the proper lugs and checks in the stone to receive the sash. Obviously, if a change is made in the sash to be used, and a different sash is substituted, the cut stone company must know this and be furnished with a complete new set of working information. One important bit of information that is necessary is the dimensioned location of the sash to the wall line.

Where stone is used as trim with brick facing, the stone should be detailed so as to work with the brick course heights. It is therefore essential that the cut stone company be furnished with full information as to the brick course heights to be used and to be notified of any changes, if made.

This plate shows tile backing. Should brick backing be used, strap or cramp anchors should replace the toggle bolts with the straps or cramps extending back and tieing into the brick work.



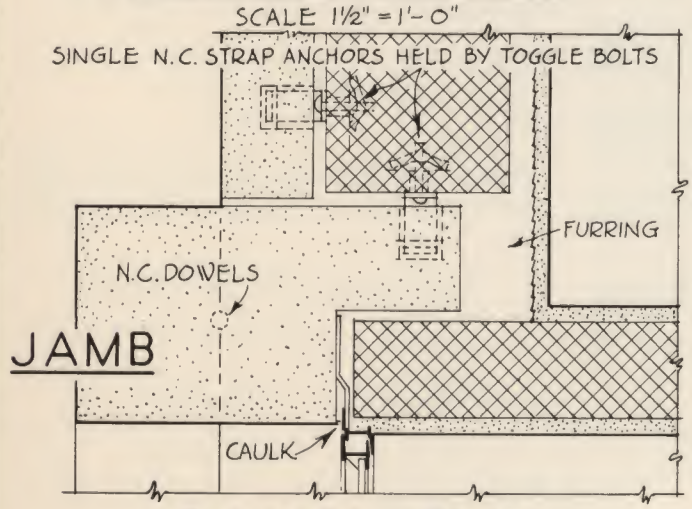

## SECTION A–A

SCALE 1½" = 1'-0"

## KEY TO MATERIALS

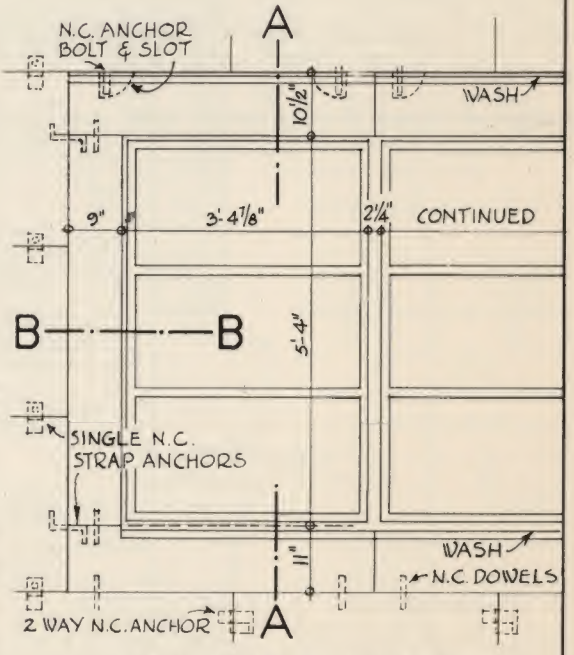
| | |
|---|---|
| LIMESTONE | |
| ϕ L.B. TILE | |
| BRICK | |
| METAL | |
| PLASTER | |
| WOOD | |

NOTE: * N.C. = NON-CORROSIVE
ϕ L.B = LOAD BEARING




## PLAN B–B

SCALE 1½" = 1'-0"




## ELEVATION

SCALE 3/8" = 1'-0"

# WINDOW SURROUND TREATMENT

PLATE Nº 9

# PLATE NO. 10

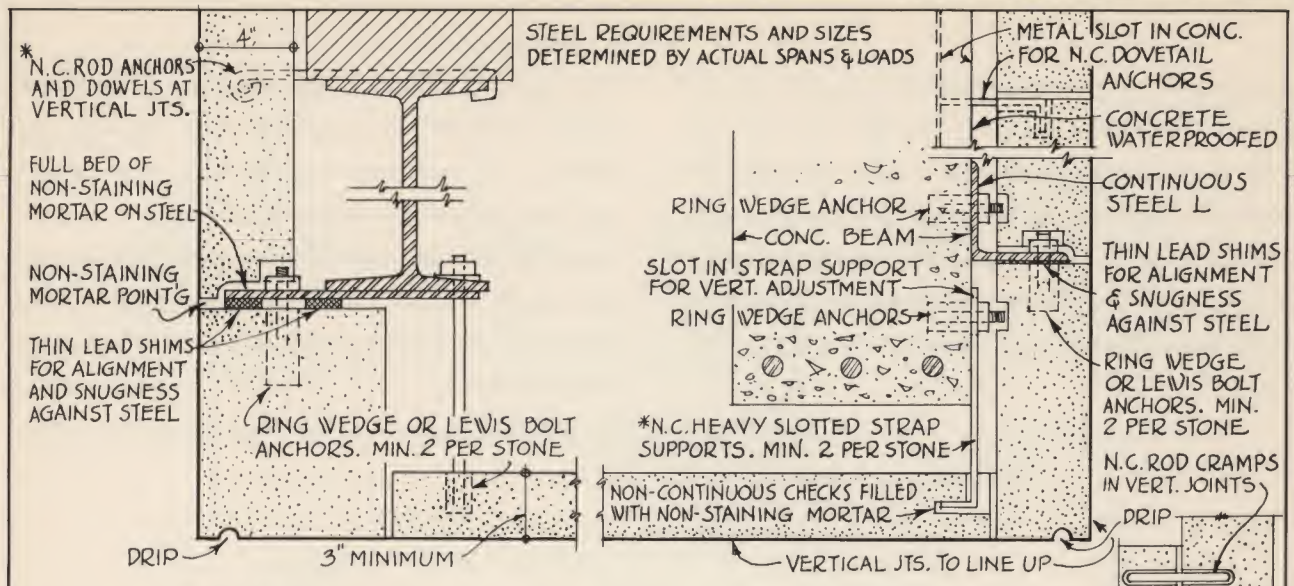
Suggestions for supporting lintels under various conditions are set forth in this plate. A study of the details shows that consideration has been given to permit the different stones to be set in a logical sequence so that they can be properly supported and either doweled or cramped together where needed. It should be noted that provision has been made for adjustment or alignment of the stones so that each can be brought into its exact position. This is very important in any supporting scheme and it should always be given a thorough study by the designer. Also the ease of inserting and installing supporting devices and necessary clearances must be provided for. Where a supporting hanger is slotted to permit adjustment and is held in position by a nut, tightened against the hanger, if the stone is sufficiently heavy so as to cause the hanger to slip down, the nut should be tack welded to the hanger after tightening.

Numerous deviations from the methods shown can be easily developed by the designer to adapt these suggestions to his particular problem.

Design information showing correct types, sizes, etc. for various applications of the ring-wedge anchors ("Cinch," "Star Slugin" or equal) is available from the manufacturers.

In detail D, the toggle bolt referred to is a type such as a "Star Snapin" or equal. Design and installation information is available from the manufacturers. Also full information can be obtained from the manufacturers of powder stud drivers as to the correct applications for the use of powder driven studs for attaching anchor clips to the backing. Not all types of backing are satisfactory for this device and this should be determined before used. If powder driven studs are used too near an edge of the backing they tend to split the material. Therefore, this should be given consideration. However, where this device is feasible, it is a very simple and quick way of attaching anchors where other methods might prove difficult and slow.

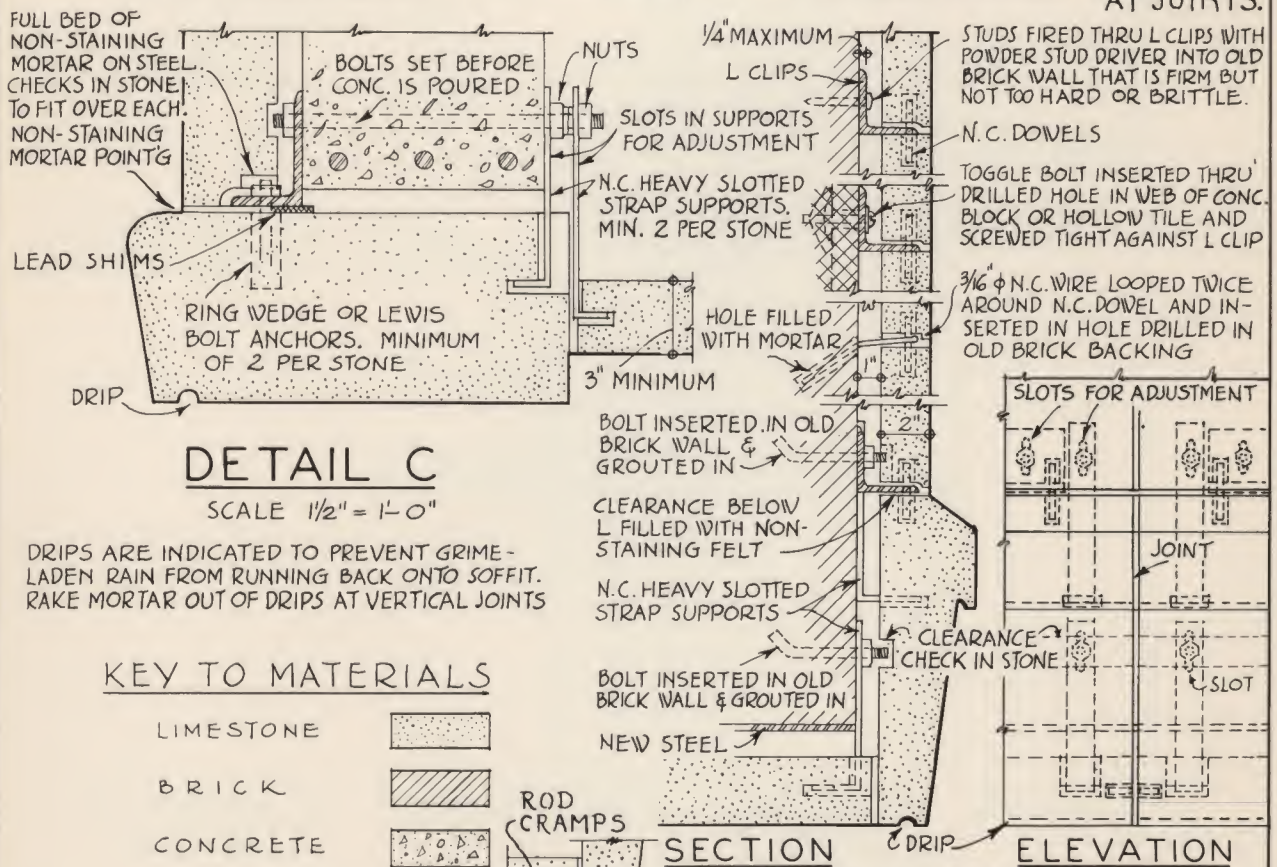
As is true of all new methods of construction, techniques for the use of powder driven studs are being steadily improved so as to broaden their possible applications and to overcome present limitations and technical obstacles.




## DETAIL A

SCALE 1½"=1'-0"

## DETAIL B




## DETAIL C

SCALE 1½" = 1'-0"

## DETAIL D

SCALE 1½"=1'-0"

DRIPS ARE INDICATED TO PREVENT GRIME-LADEN RAIN FROM RUNNING BACK ONTO SOFFIT. RAKE MORTAR OUT OF DRIPS AT VERTICAL JOINTS

### KEY TO MATERIALS

- LIMESTONE
- BRICK
- CONCRETE
- METAL

* N.C. = NON-CORROSIVE

METHODS OF ATTACHING STONE AT SOFFIT IN REFACING EXISTING MASONRY WALLS.

# STONE LINTEL HANGING

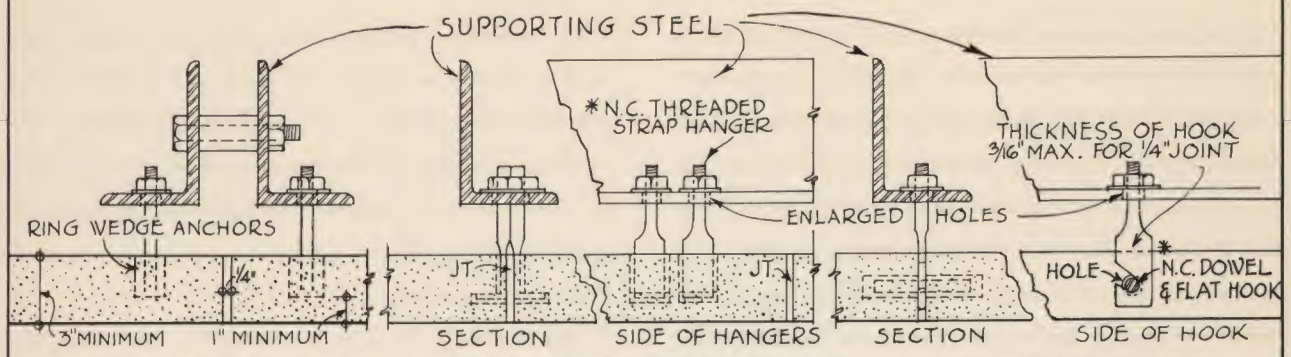
PLATE Nº 10

# PLATE NO. 11

The designer is given various methods of supporting soffit slabs in this plate to enable him to select one that will best suit his particular problem. The ring-wedge and the flat hook and dowel hangers require only easily drilled round holes in the stone whereas the threaded strap, the bolt and plate and the lewis bolt hangers require slots. Such slots are slightly more expensive to cut than to drill holes.

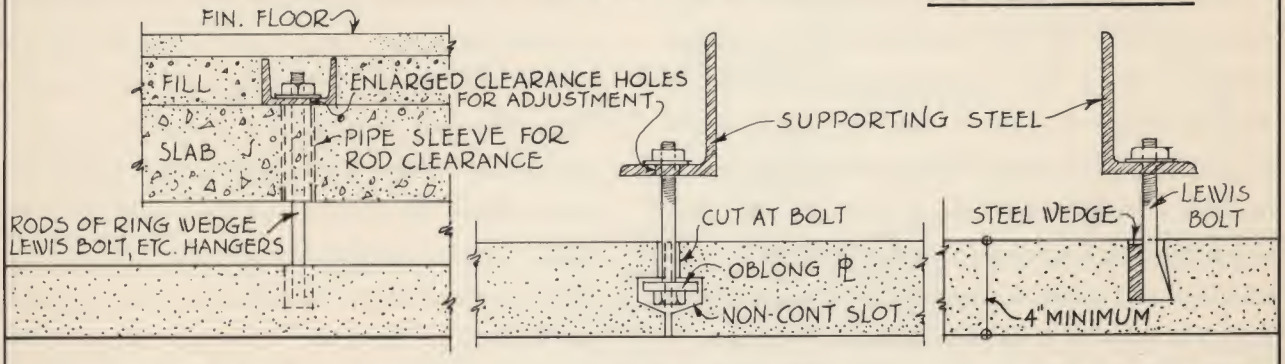
The ring-wedge, the threaded strap and the lewis bolt hangers offer the best opportunity for adjusting and aligning each individual stone since, by these hangers, each stone is free from adjoining members.

Design information showing correct types, sizes, etc. for the correct applications of the ring-wedge anchors ("Cinch," "Star Slugin" or equal) is available from the manufacturers.



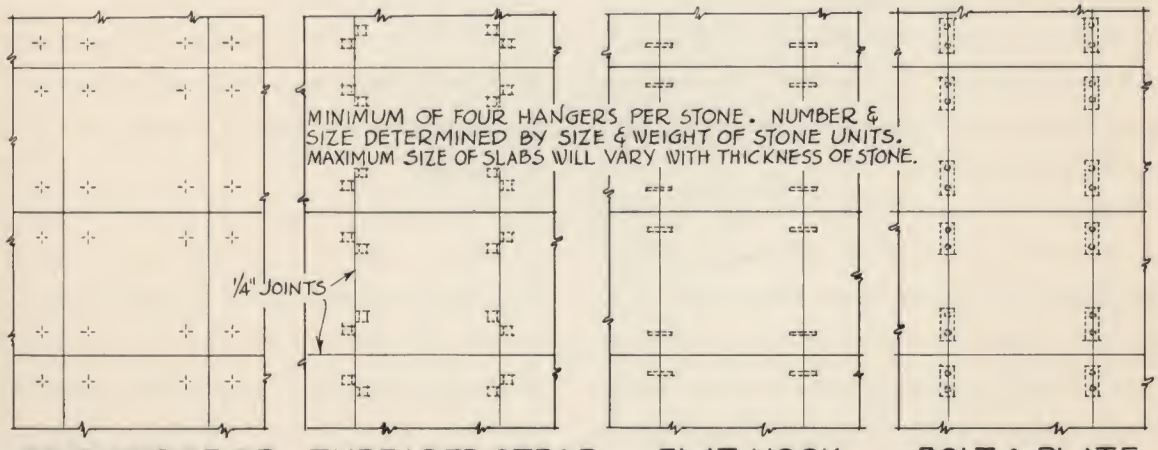

RING WEDGE HANGER | THREADED STRAP HANGER | FLAT HOOK & DOWEL HANGER

SCALE 1½" = 1'-0"




HANGER ROD CLEARANCE SLEEVE THROUGH CONCRETE | BOLT & PLATE HANGER | LEWIS BOLT HANGER

SCALE 1½" = 1'-0"




RING WEDGE OR LEWIS BOLT | THREADED STRAP | FLAT HOOK & DOWEL | BOLT & PLATE

## PLAN ARRANGEMENTS OF HANGERS

KEY TO MATERIALS: LIMESTONE | CONCRETE | METAL

* N.C. = NON-CORROSIVE

INDIANA LIMESTONE INSTITUTE

# STONE SOFFIT HANGING

PLATE No 11

# PLATE NO. 12

Flat Indiana Limestone produced to a thickness of 2" is ideal for refacing old masonry buildings, particularly, commercial buildings that usually set on or are near sidewalk lines. 2" facing adds only half as much weight to the old walls as does orthodox 4" thick facing; also the 2" facing does not encroach over a property line as much as does 4" facing. A big saving in freight from the cutting mills to the building locale is effected through the use of 2" thick facing over 4" thick material and also a saving in rough stock cost. However, the designer should not expect the lump sum price for a given building where 2" facing is used, to be just half the price that it would be should 4" facing be specified. This is due to the fact that just as much drafting and cutting labor is required to produce the 2" facing as the 4". Also more care in handling is necessary to avoid breakage.

Numerous and various applications for 2" facing can be conceived from the suggestions shown on this plate. In cases where all projections on an old structure are cut back to the wall line and the windows filled with masonry to form a backing, the new stone facing can be easily installed over the old wall by supporting and anchoring by one of the appropriate methods shown in plans A-A and B-B and in sections C-C and D-D. The designer should determine which method best applies to the condition of the existing backing.

Since old structures are usually brick, the supporting shelf angles can easily be attached by bricks being removed and attaching bolts grouted in the holes in the wall. Except for the bottom supporting shelf angle, supporting shelf angles should be placed after the new stone facing, immediately below, has been set. Vertical adjustment slots should be provided in the vertical legs of the angles to engage the attaching bolts set in the wall. The slots permit final alignment of the angles with the stone.

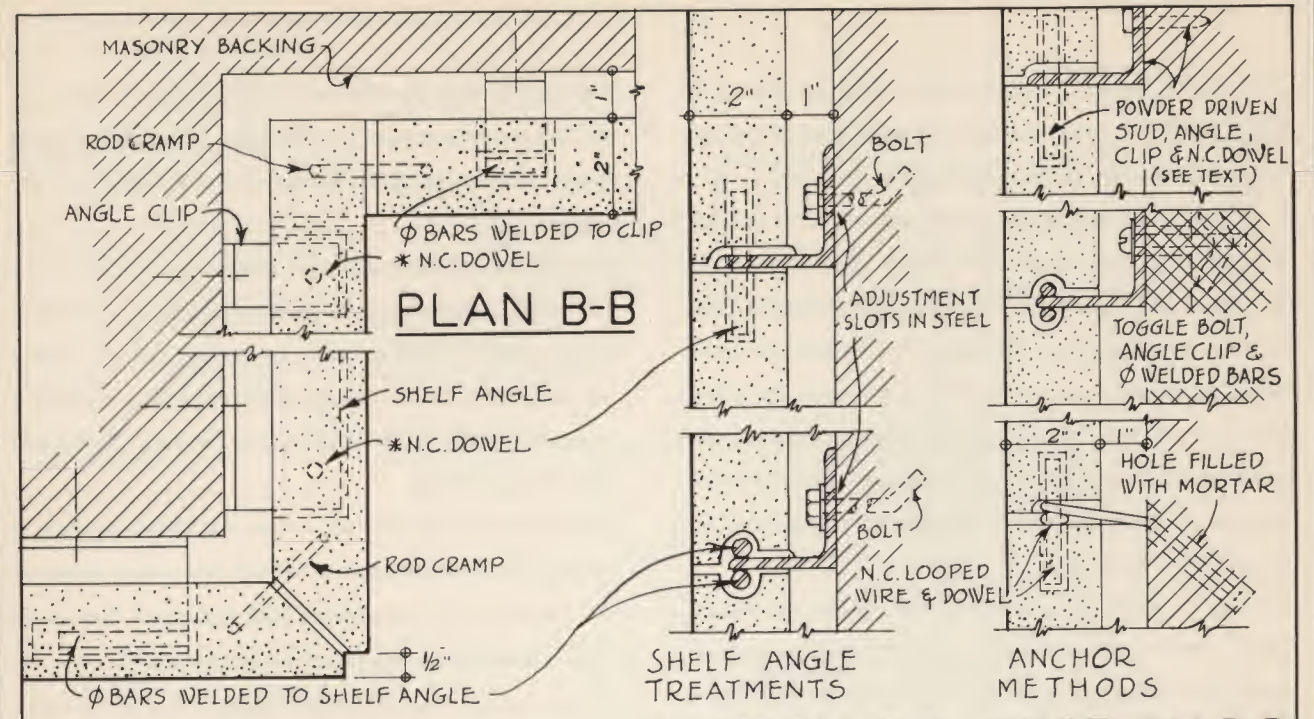
An easy method of tieing an anchor dowel to the backing is by the use of a heavy non-corrosive wire looped twice around the dowel and grouted in a hole drilled at an angle in the backing.

Toggle bolts can effectively be used for attaching dowel clips to hollow tile or concrete block backing.

Powder driven studs offer a possible fast and easy method for attaching anchor clips to old walls where the wall material is firm but not too hard or brittle. By this method a hard steel stud is literally shot through the metal clip and into the backing. The manufacturers of powder-stud drivers should be consulted for the feasibility of this method with the particular surface to be used and their recommendations should be followed. They can recommend the correct size powder cartridge and stud to use. Powder driven studs should be used only with the approval of the stud gun manufacturers to assure that the particular backing in the building will satisfactorily receive and hold the studs.

Thin 2" facing can economically be used in sizes up to 4'-8"x3'-0". Sizes larger than this increase in cost per square foot due to the risk of breakage in handling and in shipping.

Quirked corners are recommended for outside corners as shown in Plan A-A to avoid possible settling cracks that might result should back checked corners of depths greater than 2" be used. Also in the jointing scheme shown the quirk miter corners eliminate undesirable head joints.




PLAN B-B

PLAN A-A

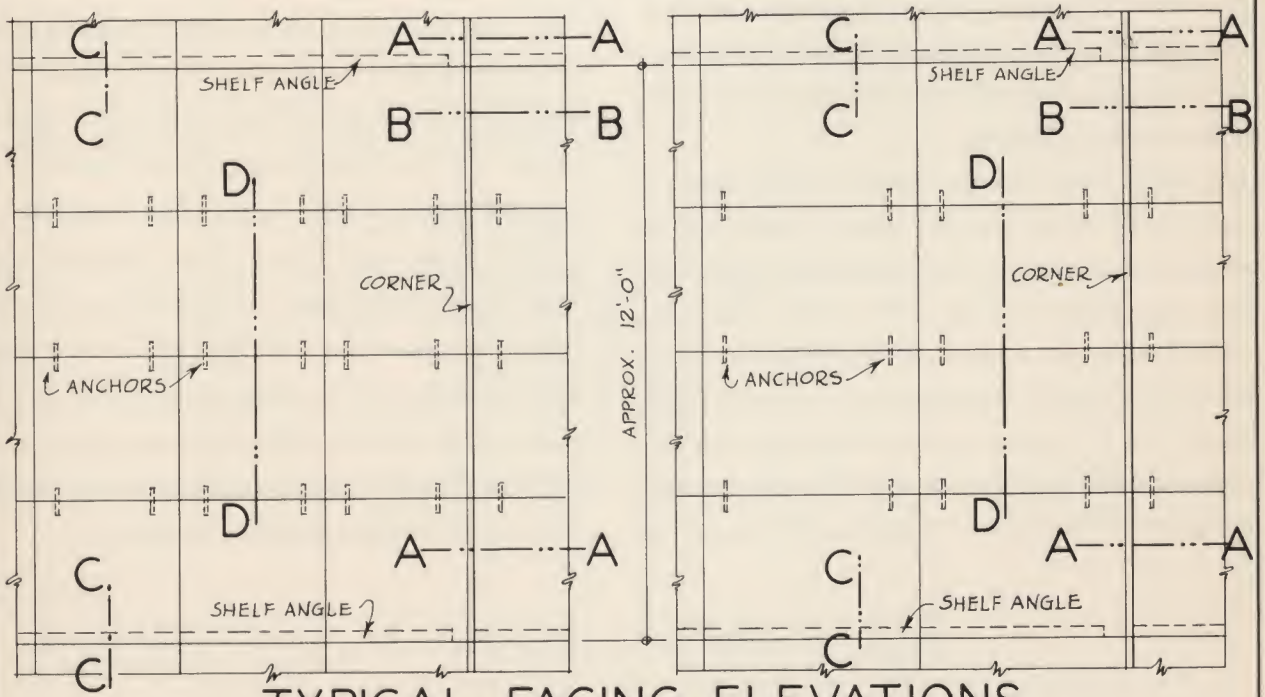
SHELF ANGLE TREATMENTS

SECTION C-C

ANCHOR METHODS

SECTION D-D

SCALE 3" = 1'-0"




# TYPICAL FACING ELEVATIONS

SCALE 1/4" = 1'-0"

NOTE: SEE TEXT FOR FULL DISCOURSE ON APPLICATION OF 2" FACING

*NOTE: N.C. = NON-CORROSIVE

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# APPLICATION OF 2" LIMESTONE FACING

PLATE Nº 12

# PLATE NO. 13

This plate illustrates the most commonly used method of tieing down a cornice having a projection great enough to have a tendency to be unbalanced in the wall.

It will be noted that two methods are shown to provide clearance for the tie rod at the joints. One shows a slot and one shows a groove. Both are equally effective. Due to different production methods of different cut stone companies, some prefer one method and some the other. Therefore in checking cut stone drawings, which have been submitted for approval, we suggest that the architect accept either method as satisfactory if requested by the cut stone company.

The stone check to receive the bolt plate, as shown, permits the counter flashing to extend into the wall immediately above the cornice. If the counter flashing is run up the back of the parapet before being imbedded in the parapet, the bolt plate can lay on top of the cornice with the bolt end and nut extending up into the parapet brick which can easily be clipped for clearance. The plate check in the stone is thus eliminated and a substantial saving is effected.

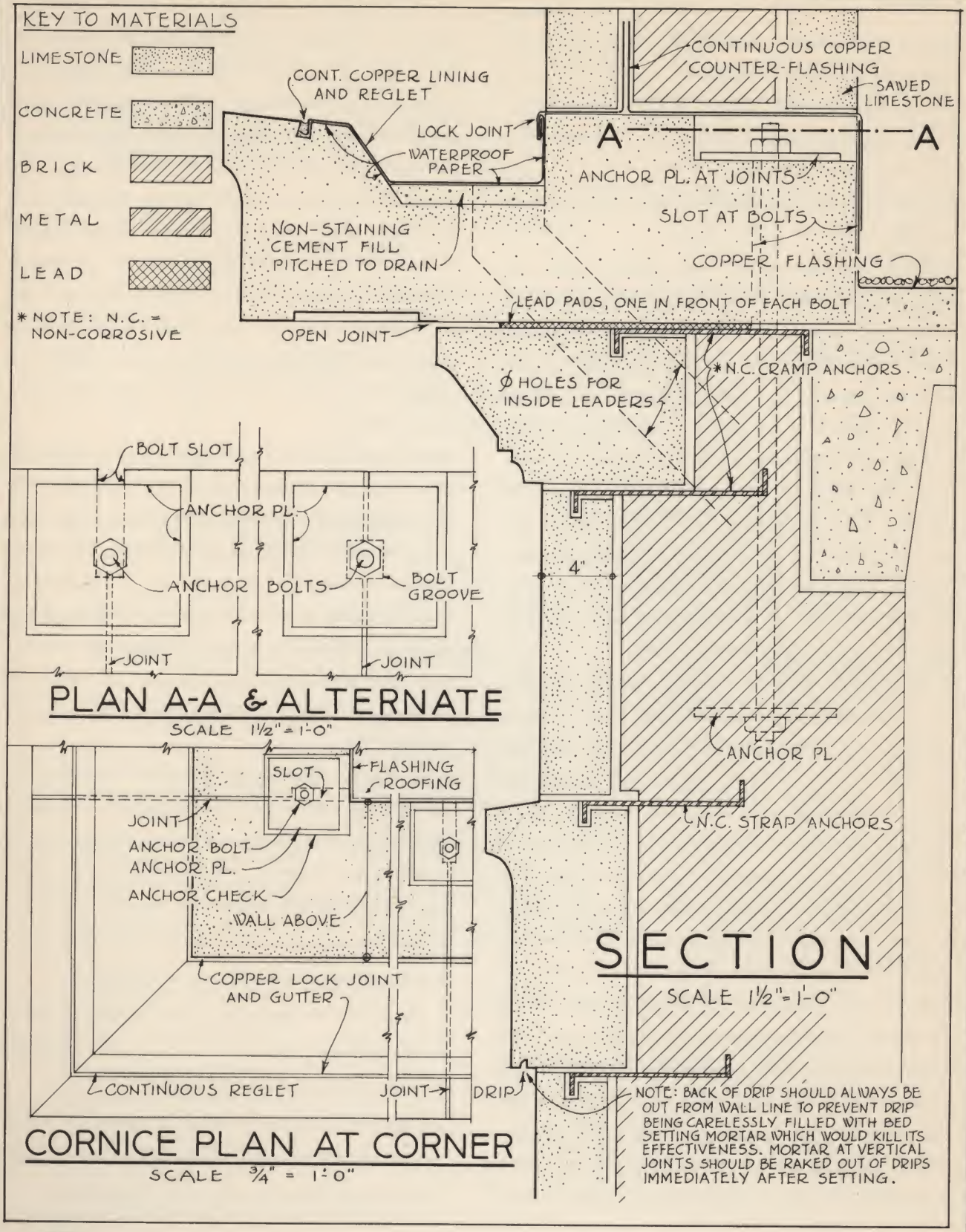
The method shown for the treatment of the gutter is recommended as the most economical in that it permits all pieces of cornice to be planed to the same gutter section, thus, greatly facilitating this machine operation. This will reflect to the purchaser's advantage in a lower stone price. Copper is satisfactory for the cornice gutter lining. Due to its shape, water cannot wash over the copper and down over the face of the stone with resulting green discoloration from the oxidation of the copper. A good grade of non-staining waterproof paper should be laid between the copper and the stone to prevent staining due to sweating or condensation on the under side of the copper.

Brick backed parapet walls are often a source of trouble in that rain gets in the joints and seeps down into the walls below. Much of this trouble can be avoided by facing the backs with one of the less expensive grades of Indiana Limestone such as Rustic Buff, Rustic Gray or Variegated with a sawed finish.

The bed joint, immediately below the heavy cornice, is left open back far enough to remove any undue compressive stress on the projection of the bed mold that might have a tendency to break off the projection.

At the vertical joints in any member, such as cornices, soffits, etc., where the mortar might fall out, the stone can be roughened by the use of tooth chisels or pointing tools. This will tend to permit better adherence of the setting and pointing mortar to the stone. However, if this is desired, it should be *specifically mentioned* in a specification. It is not standard practice in the industry to do this extra hand operation unless explicitly specified.

The drip shown at the bottom of the architrave is very important to keep the stone facing below from becoming streaked by grime laden rain. The backs of drips should be out from the wall line at bed joints to avoid the possibility of setting mortar being carelessly allowed to fill the drip. All drips should be carefully raked out after setting to see that they are free of any mortar.

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# MODERN GUTTER CORNICE DETAIL

PLATE № 13

# PLATE NO. 14

Next to the foundation, functionally, the coping is the most important part of a wall. If it is not effective and water gets into the wall, serious damage is sure to result. Properly applied, Indiana Limestone forms a perfect coping and protection for walls.

All copings should have effective washes to the back of the wall.

Generally speaking through wall flashing should be provided immediately below stone copings. A two or three way bond type of flashing is best. Such flashing attains an excellent bond with the bed mortar. If the joints are protected by non-corrosive metal joint covers such as "Minwax Weathercap," "Perfection" or equal and the coping projects both front and back with drips to prevent water from creeping back to the bed joint by capillary action, the through wall flashing can be dispensed with. Also if the coping is covered with non-corrosive counter-flashing into a reglet near the front of the coping, the through wall flashing is not so essential since the joints are protected from water.

A top grade of caulking compound, carefully installed as per the manufacturer's specifications, is preferable to mortar in the vertical joints since there is less likelihood of shrinkage hair cracks developing that would admit water. A note on the plate covers such an installation. If mortar is used, then a joint cover such as "Perfection" should be used. It is designed for such a joint. The cover should be made of an aluminum alloy rather than copper to avoid staining. If the entire coping is covered by counter flashing, mortar is quite satisfactory for the joints.

Expansion joint gaskets, such as "Grund" or equal, should be installed per manufacturer's specifications for every twenty lineal feet. If, on long buildings, general vertical expansion joints exist through the entire building, a coping expansion joint should be provided at such points.

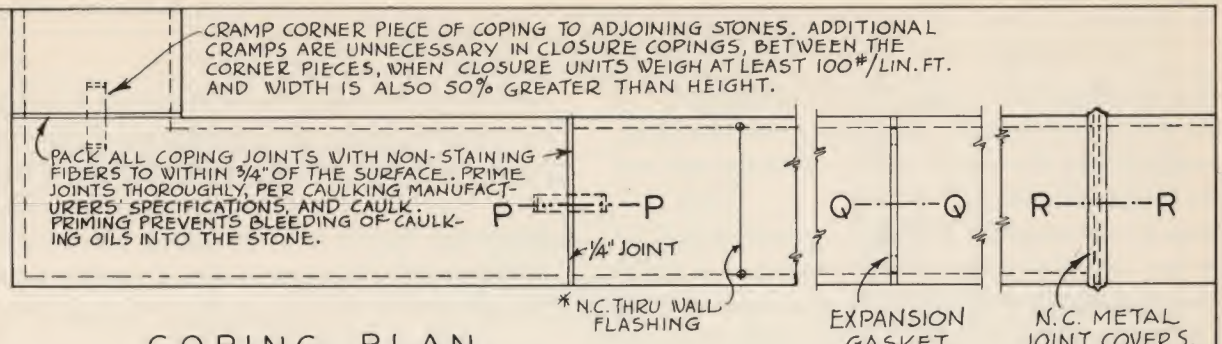
Where coping is located on promenade decks, etc., where it is subject to human contact so that it can be leaned against or sat upon, it should be effectively doweled to the wall below to prevent it being moved. Where such dowels puncture the through wall flashing, by the use of two or three way bond flashing, water is quite effectively prevented from leaking from a vertical joint to the dowels due to the shape of the flashing. However, as an added precaution, non-corrosive collars can be soldered to the flashing to permit the insertion of the dowels. Caulking is applied around the dowel at the top of the collar to seal the dowel. Soft non-staining mortar in the coping dowel hole permits the coping to be bedded into place and, when the mortar sets, the coping is very positively anchored.

Where dowels are not necessary, it is recommended that corner coping stones, either for an exterior corner or for an interior corner, be cramped to the adjoining pieces in all cases. A note on the plate clarifies the use and non-use of cramps for coping closures. The basis of this recommendation is that where stones of the weight and proportions shown are properly bedded and protected from water getting into the vertical joints and bottom bed, no loosening frost action that would move the coping can develop.

In the case of light coping, end dowels, requiring only drilled holes, can be used for closures in lieu of cramps where the vertical joints are covered by counter-flashing or joint covers. A good grade of non-staining waterproof paper should be laid between the copper counter-flashing and the stone to prevent staining due to the sweating or condensation on the under side of the copper.

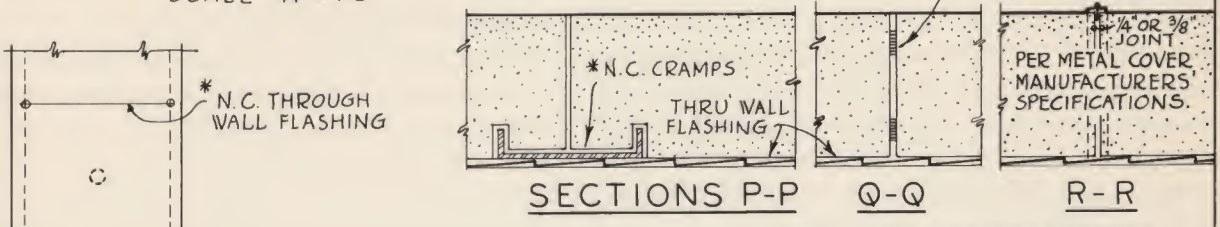
A suggestion for anchoring coping to steel is shown. Several different applications can easily be developed from this treatment by the designer.

Owners would do well to utilize the services of experienced architects for periodic inspections of copings to see that joints and flashing are kept tight at all times.

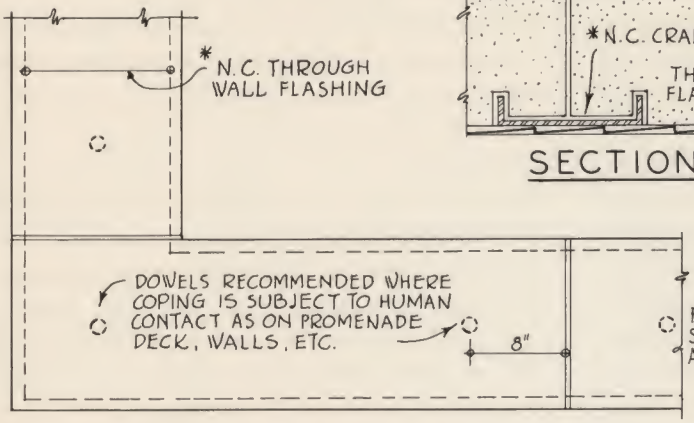



## COPING PLAN

SCALE 3/4" = 1'-0"

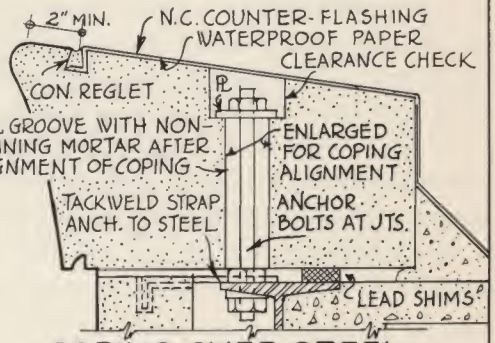



## SECTIONS P-P Q-Q R-R

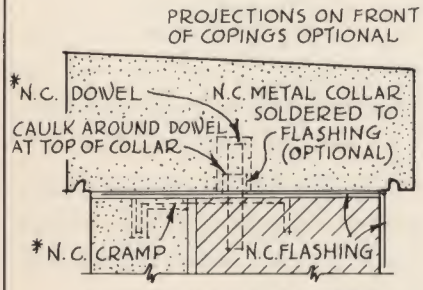



## COPING PLAN WITH DOWELS

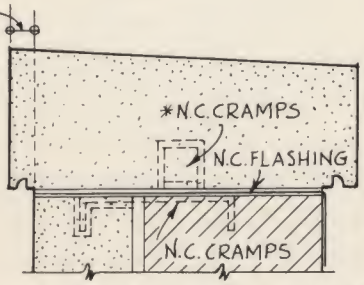
SCALE 3/4" = 1'-0"



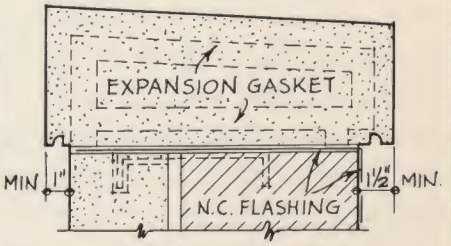

## COPING OVER STEEL



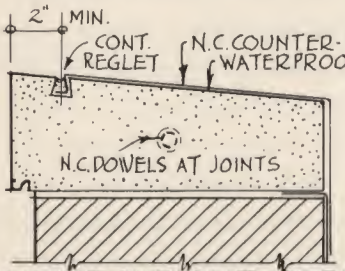

## DOWELED COPING




## COPING WITH CRAMPS




## COPING WITH EXPANSION GASKET




## LIGHT WEIGHT COPING WITH REGLET & FLASHING

SCALE OF COPING SECTIONS 1 1/2" = 1'-0"

## KEY TO MATERIALS

* N.C. = NON-CORROSIVE

LIMESTONE
CONCRETE
BRICK
METAL

# COPING DETAILS

PLATE Nº 14

# PLATE NO. 15

This plate illustrates a suggested modern treatment of an old architectural feature. Nevertheless, the basic structural principles shown here apply to both the new and the old equally well.

Since a rose window is not tied to any backing and, by its very nature of design, is free standing, it is highly essential that the tracery be well doweled together. This is especially true if located near heavily traveled thoroughfares where traffic vibrations may be a serious factor.

However, there is a limiting factor that prevents the use of dowels in all joints. Certain pieces of the tracery, that serve as key stones and are set last, cannot be moved into place if dowels are used. Therefore it should be the object of arranging the joints of the tracery to hold the number of such keystones required to a minimum. Joints, where it would be difficult or impossible to install dowels, are each indicated on this plate by an encircled "X". However, it is good practice to have dowel holes provided at all joints. Often-times it is possible for the setter to be able to insert short dowels where it would appear to be impossible on a drawing. At those joints where it is found that dowels cannot be used, mortar can be worked in the dowel holes and this will help lock the stones together. All tracery joints should be roughened in cutting, for this assures better bond and will minimize the possibility of movement of the tracery.

Pockets in tracery where water may run down and be trapped should be eliminated. Structurally it is well to arrange the jointing so that all pieces of tracery are approximately the same size. This also helps the appearance. The design should be such that the stresses transferred from piece to piece at their joints along their axes are compressive stresses insofar as it is possible. Avoid undue bending stresses on the arm of any one piece of tracery by shifting joints so as to equalize stresses between adjoining pieces. Every effort should be made to eliminate conditions that, for no good reason, increase the difficulty of planing and hand cutting. For instance, perforated pieces, where glass is to be inserted in reglets in the perforations, should be avoided. Such reglets are almost impossible to cut and the cost is greatly increased. It is better in such cases to provide more joints so that mold patterns can be easily applied at the joints. This also makes it easier for the stone cutter to apply his tools to the molds and reglets.

The duplication of as many pieces as possible is economical for it simplifies the stone working drawings and the full size layouts that are required. It also requires fewer mill tickets and fewer planing and cutting patterns. In general, it speeds up production and deliveries. Duplication likewise helps the setting, permitting the interchangeability of pieces in case of possible breakage. Thus the setting can proceed while the replacement of a broken piece is being made.

Therefore, we urge that architects, in checking stone working drawings submitted for approval, have a receptive attitude to the recommended jointing shown.

If jointing changes, from the original architectural drawings, are suggested on submitted stone working drawings, such changes are made in the interest of a structurally better window. As many of the foregoing factors as possible will be taken into consideration in any jointing recommendations made by the cut stone company.

Dimensions shown on this plate are for the purpose of giving the proportions of this particular window and should not be interpreted as being a recommended standard. Indiana Limestone can be cut to any reasonable dimensions established by the designer.

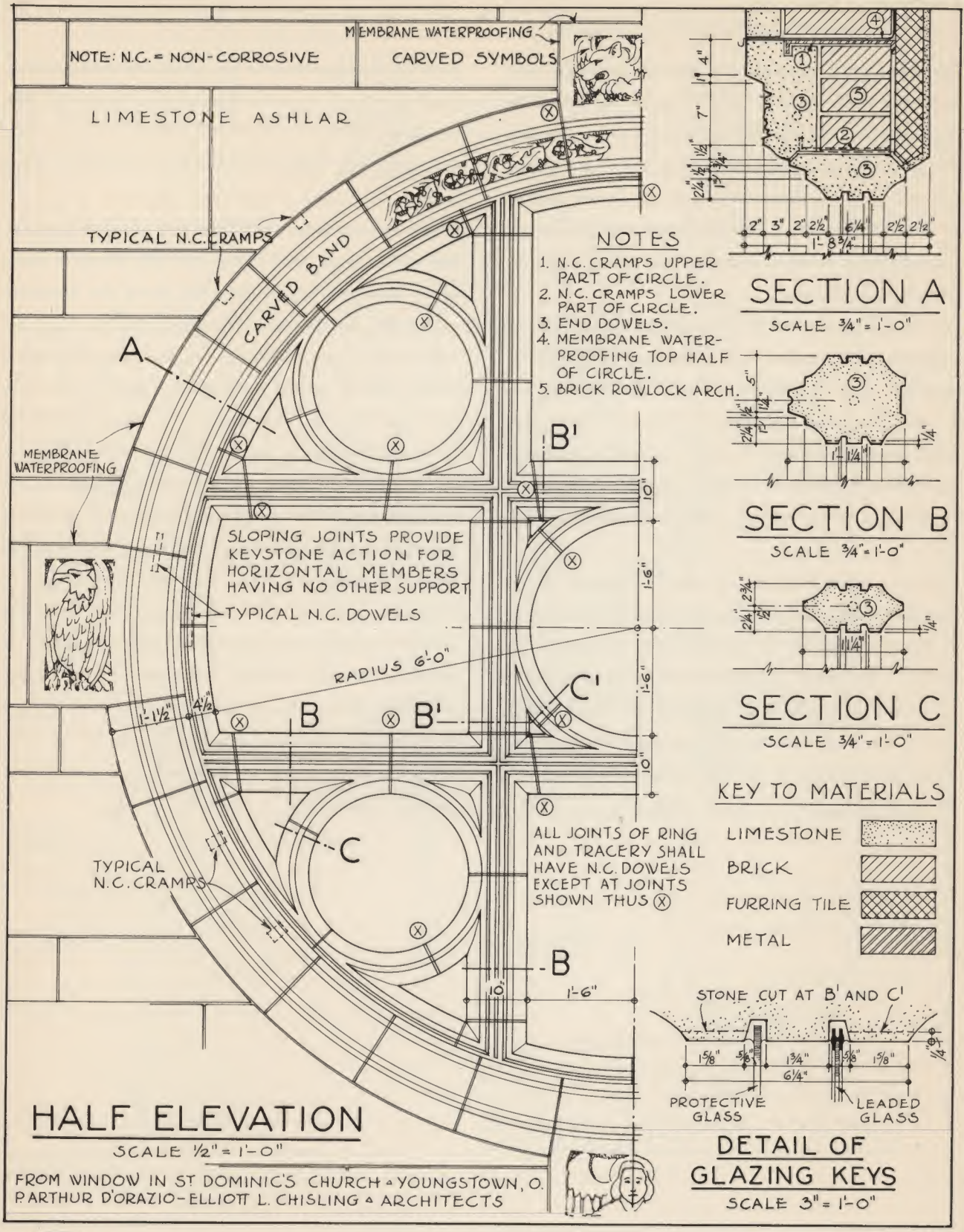
Note that where parts of the window stone, such as the outer ring, are backed by brick, N. C. strap anchors are used to tie the stone effectively to the backing.

Particular attention is called to the membrane waterproofing protecting the top half of the outer arch ring. This is very necessary to prevent possible leakage of water into the wall, the arch ring and the tracery.

Such a precaution (whether it be non-corrosive metal or foil) is doubly important if granite or rough hard ledge rock is used for the ashlar facing, and Indiana Limestone used only for window trim.

Granite or hard ledge rock usually have rough backs and end joints so that the backing, whether it be brick, tile or concrete block, does not get complete contact with the back of the facing. Voids between the rough back of the facing and the backing material invariably exist, thus permitting any water leaking into the wall to work downward back of the facing under hydrostatic pressure. It reaches and saturates the Limestone and also tends to work down through the Limestone joints.

Salts carried in solution by this water from above cause staining and efflorescence on the face of the Limestone. The membrane waterproofing prevents this water from reaching and harming the Limestone.

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# ROSE WINDOW DETAIL

PLATE NO 15

# PLATE NO. 16

The same basic principles of jointing, doweling and anchoring which apply to Plate 15 and as set forth in its accompanying text, likewise apply to this plate. Jointing that permits as much duplication of similar shaped pieces as practical is desirable. Jointing should also be such as to simplify the planing and the hand cutting of stone tracery and as to avoid conditions that will create difficult setting problems.

These factors should be borne in mind by the architect in designing Gothic tracery and in checking stone working drawings of tracery features when submitted for approval. The drafting department of the cut stone company gives careful study to these matters in preparing its working drawings. Its recommendations and suggestions should warrant serious consideration by the architect.

It will be noted that the step does not extend under the stone jambs, but is a slip sill. This prevents the possibility of compressive stresses breaking the end of this sill. This same principle applies to the ends and edges of all items such as platforms, flagging, etc., which should never extend into or under a wall or feature where they would be subject to a resulting compressive stress.

For the same good reasons as set forth in the text for plate 15, the importance of the membrane waterproofing around the arch ring cannot be stressed too much. This is particularly true if granite or some type of hard rough rock, other than Indiana Limestone is used for the ashlar facing.

Where Indiana Limestone is used only as trim in conjunction with a rough hard facing, not only should a membrane waterproofing be installed above the limestone arches but also between all limestone and the facing no matter what type of feature the limestone may form. In the case of various types of trim inserts, where the limestone is an isolated stone, it can be protected by covering all surfaces that extend into the wall with a heavy asphaltic coating. However, if joints occur in the limestone trim, in order to give complete protection to the limestone a continuous type of membrane waterproofing is best. In addition to these suggested protections, it is of prime importance to see that the pointing of all joints of the hard facing be maintained as nearly watertight as possible to try to prevent any water getting into the wall in the first place. Also all parapet flashing must be kept in a watertight condition. This requires constant periodic inspection for water is the worst enemy of all types of masonry construction.

## KEY TO MATERIALS

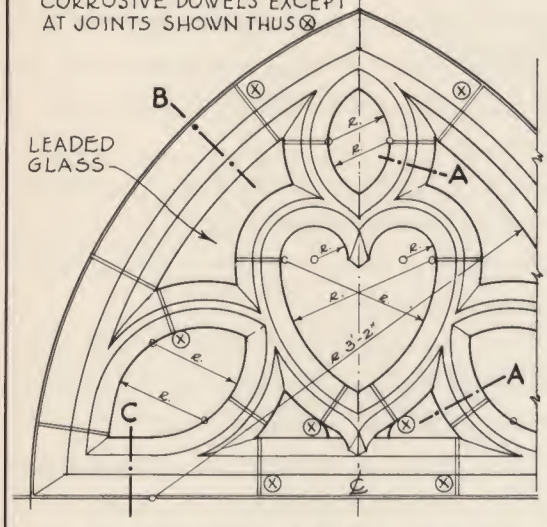
LIMESTONE | BRICK

INSULATION | METAL

PLASTER | WOOD

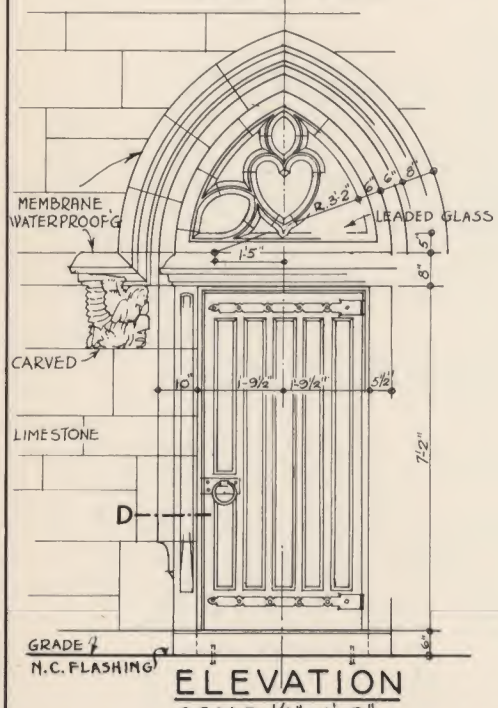
* NOTE: N.C. INDICATES NON-CORROSIVE.

ALL JOINTS SHALL HAVE NON-CORROSIVE DOWELS EXCEPT AT JOINTS SHOWN THUS ⊗



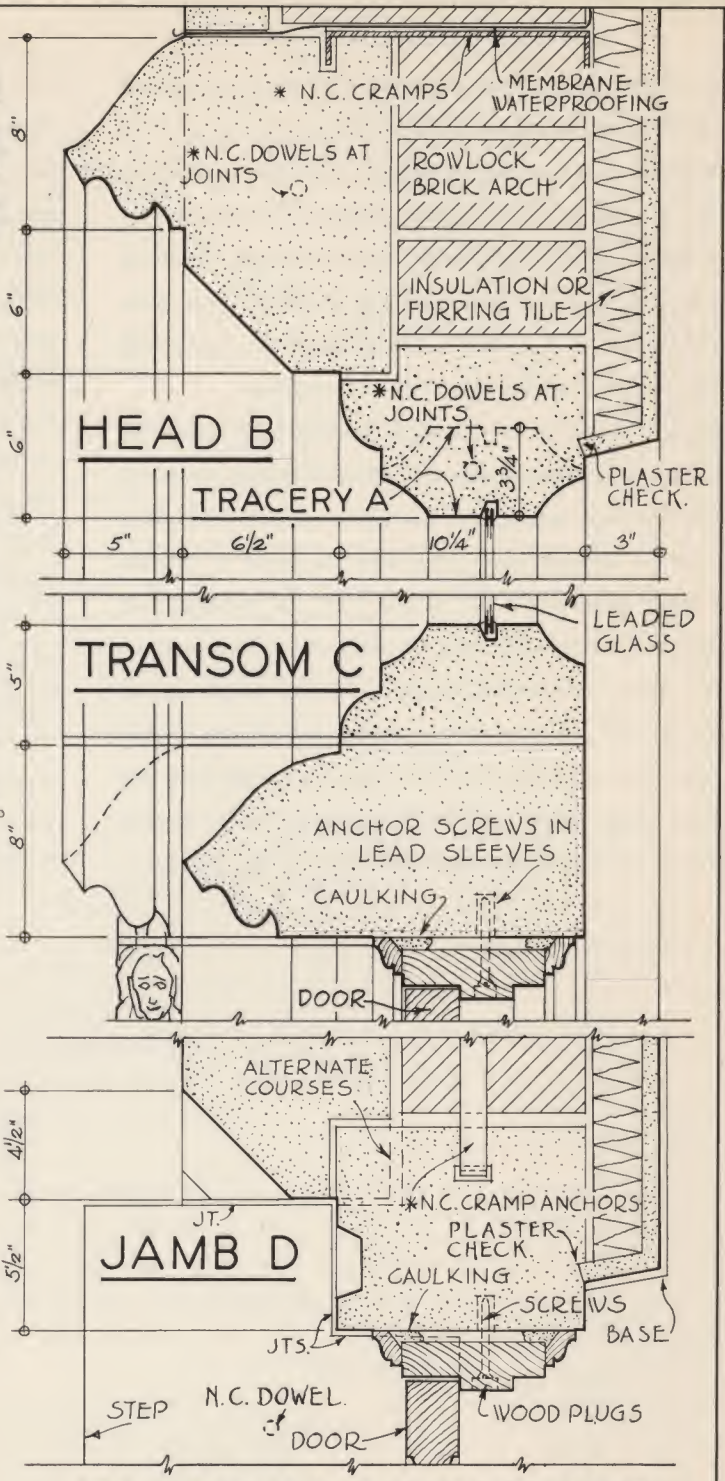

## TRACERY TYMPANUM

SCALE 3/4" = 1'-0"




## ELEVATION

SCALE 1/4" = 1'-0"




## PLANS AND SECTIONS

SCALE 1½" = 1'-0"

NOTE: DESIGNED AS A SO-CALLED "BRIDE'S DOOR" IN A CHURCH

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# GOTHIC DOORWAY DETAIL

PLATE Nº 16

# PLATE NO. 17

It is essential in the design of gable coping that the coping be effectively held in place. At the same time it is highly desirable that the method used be simple in application for economy in cutting and in setting. The heavy non-corrosive anchor straps offer such a method, requiring only an anchor slot cut in one end of each coping stone and permitting the stone to be moved down easily into place against a full mortar bed and end joint.

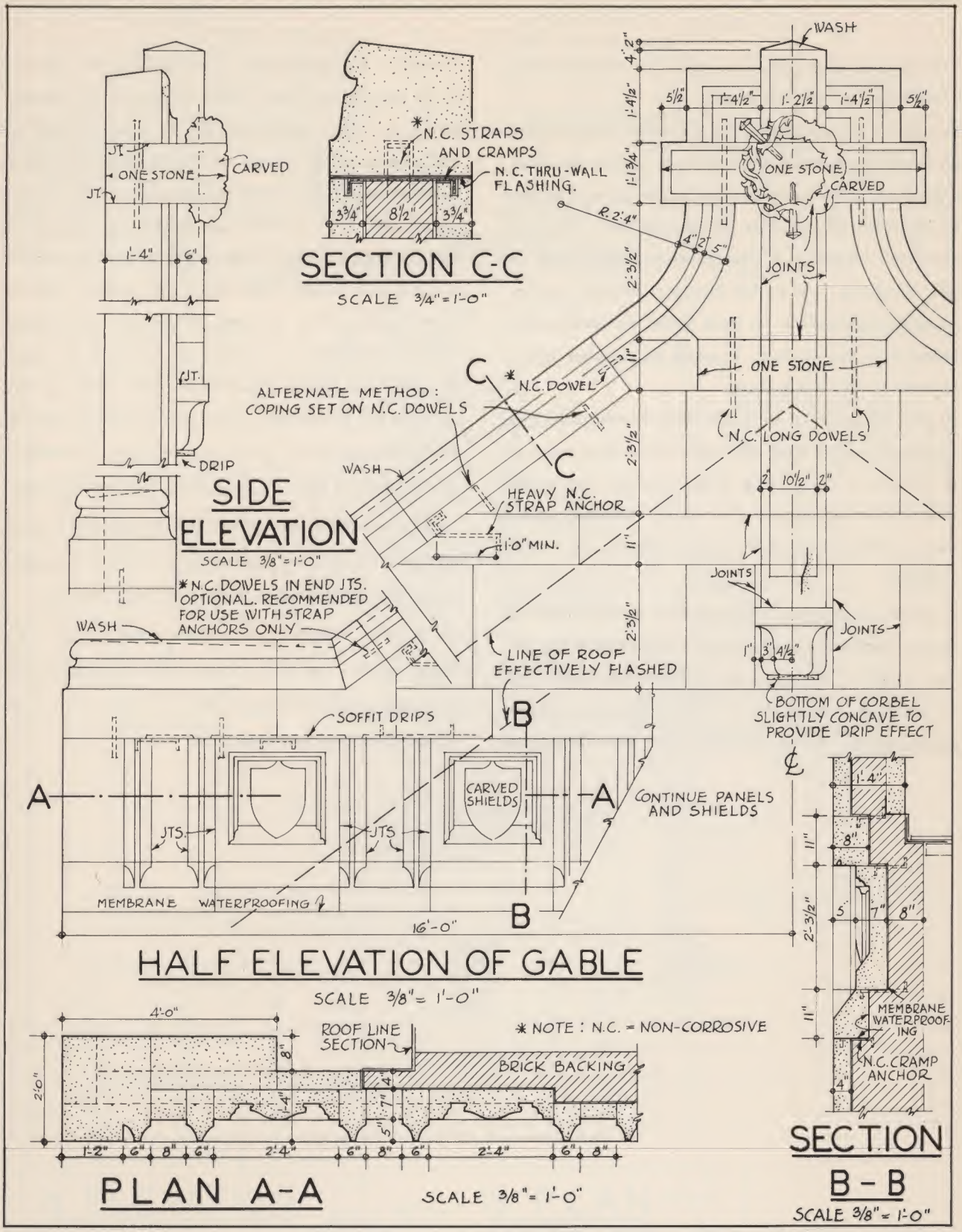
Dowels, shown as an alternate method for holding the coping, are quite orthodox and effective but do not permit quite as easy setting. In moving the coping into place over the dowels, great care must be taken to prevent it from scraping off the mortar from the buttered end joint of the adjoining stone. Dowels also tend to prevent the coping from settling snugly by its own weight against the mortar end joint of the coping immediately below. Since this is desirable in order to assure a tight joint and since strap anchors permit this, the strap anchor method has this advantage over dowels on the gable rake.

It is important that gable kneelers be heavy and effectively held to take any possible thrust of the gable coping. The plate illustrates these points.

The bottom of the corbel at the cross is formed slightly concave to cause water to drip off instead of creeping back to the wall. This prevents unsightly streaking of the wall below. Such treatment is readily applicable to all projecting features and is very good practice, particularly if the building is in a city of prevalent grime-laden atmosphere.

Since the cross feature is free standing, it is important that it be well doweled together by long heavy non-corrosive dowels to resist heavy wind pressure, thermal movement and vibration.

Note that non-corrosive metal membrane waterproofing is provided for the sill course below the carved panels to prevent water from entering the wall through the vertical joints. Foil types of membrane are very effective for this type of application as they can easily be imbedded in mortar beds.

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# GOTHIC GABLE DETAIL

PLATE Nº 17

# PLATE NO. 18

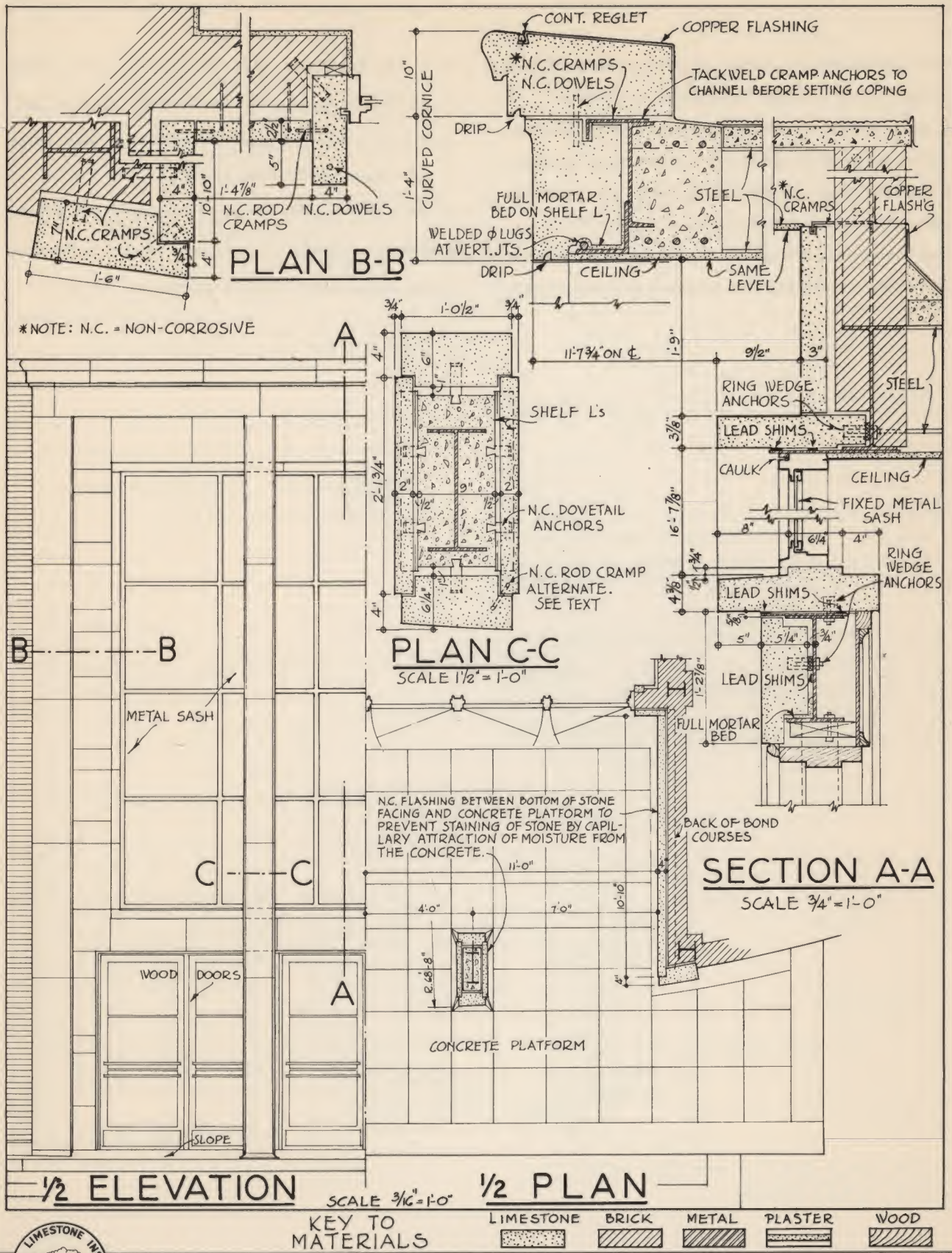
This plate illustrates a good example of the use of Indiana Limestone in an entrance feature.

Section A-A clearly shows how the Limestone is supported on the steel and how various types of anchors are used, depending on the particular application of each. It will be noted that no drips are provided on the window sill and lintel. Normally, it is imperative to provide drips on such projecting courses, but they are omitted here because the window sets far back under the portico, protected from the weather. It would be an unnecessary expense to add a drip here.

At plan B-B it will be noted that both rod and strap type cramp anchors are used. Normally, rod anchors are used in the thinner 2½" facing while the strap type cramp anchors are used on the thicker stones. However, a good heavy rod anchor can be just as effective as a strap anchor.

In plan C-C, dovetail flat anchors are shown where the stone is backed by concrete even though part of the facing is of thin 2" thickness. Rod anchors could not be used here. Metal dovetail slots are provided in the concrete when poured. When the stone is set, the anchors are inserted in these slots and turned down into the slots cut in the beds of the stone. Generally anchors are placed only in the top beds of stone but it is good practice to use anchors in both the top and bottom beds where the bed thickness is 4" or over and the course height is approximately 3'-0" or over. On stone facing where the bed thickness is under 4", it is best to use anchors in both the top and bottom beds where the course height is approximately 2'-6" or over. In this plan rod cramp anchors are shown as an alternate. If these are used, the dovetail anchors attaching the end pieces to the concrete can be omitted. Thus it is seen that two ways of solving this particular problem are possible. The drafting departments of some cut stone companies might recommend one method while others might recommend another so that in checking cut stone working drawings, the architect could approve either method as being effective.

As an important factor to prevent discoloration of the stone, where it comes in contact with the concrete platform, the note pertaining to flashing at this point is self explanatory and very important.

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# HIGH SCHOOL ENTRANCE DETAIL

PLATE No 18

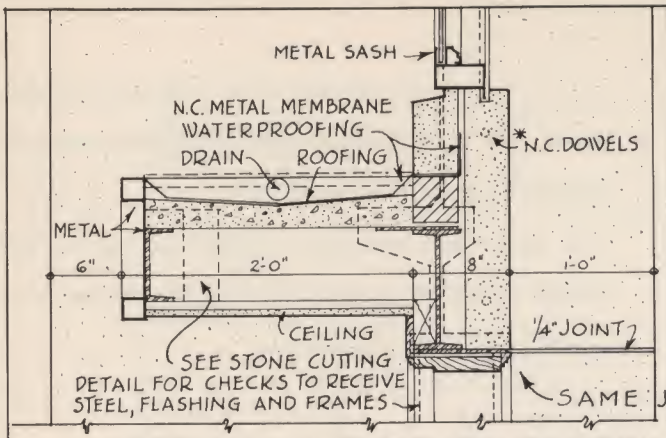
# PLATE NO. 19

The adaptability of Indiana Limestone to overcome a knotty problem is clearly illustrated in this plate.

In order to utilize continuous steel supports for the canopies at Section A-A and for the window head at Section D-D, the mullions are pierced, as shown, to receive the continuous steel members.

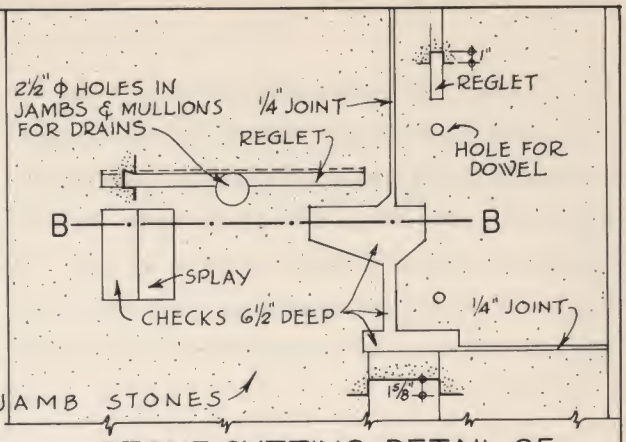
This is easily accomplished in the limestone since it can be readily cut, checked and pierced in any manner to fit around or to receive other materials. Since it can be shaped to any reasonable made-to-order shape, at comparatively low cost, it gives the architect a wide range of unhampered possibilities in design.

A study of this plate shows the various stone checks, perforations, reglets, etc., and their relation to the door frames, canopies and window frames.




## SECTION A-A THROUGH CANOPY

DETAIL SCALES 3/4" = 1'-0"



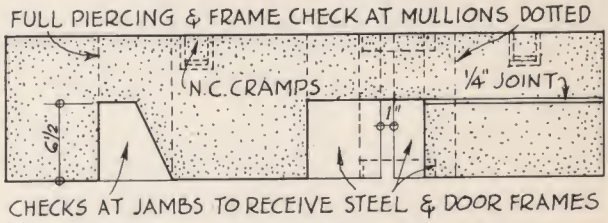

## STONE CUTTING DETAIL OF JAMBS AT CANOPY

### KEY TO MATERIALS

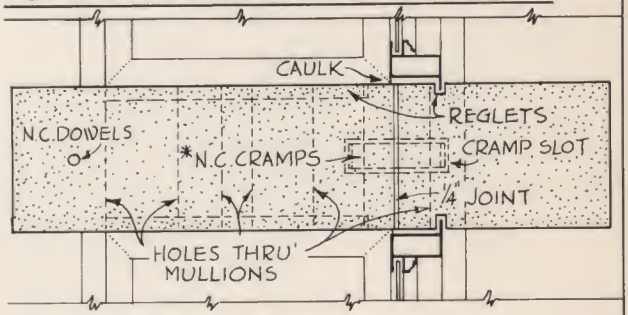
LIMESTONE — BRICK

CONCRETE — METAL

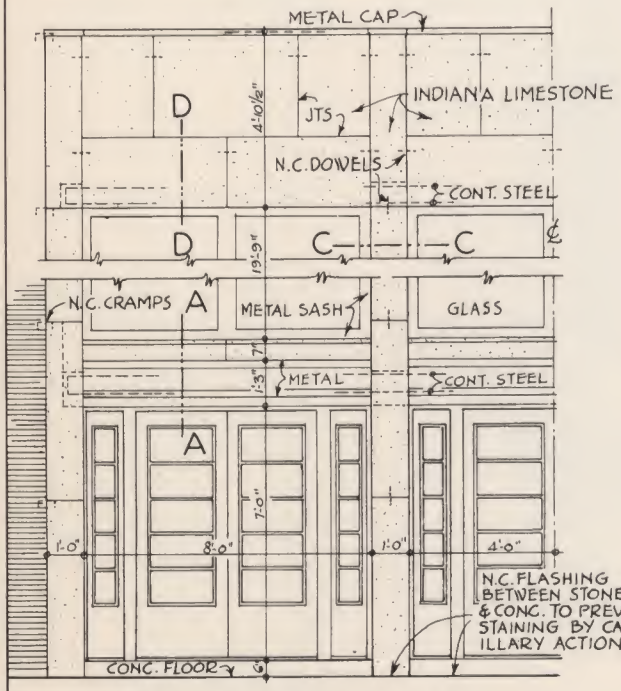
*NOTE: N.C. = NON-CORROSIVE




## PLAN B-B JAMBS AND MULLIONS

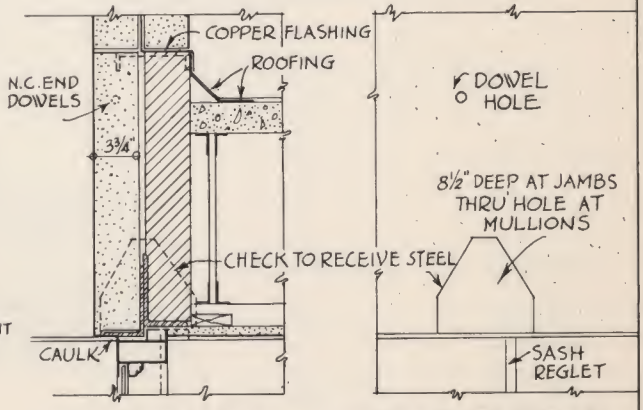



## MULLION PLAN C-C




## 1/2 ELEVATION

SCALE 3/16" = 1'-0"




## SECTION D-D WITH STONE CHECKS AT JAMBS & MULLIONS

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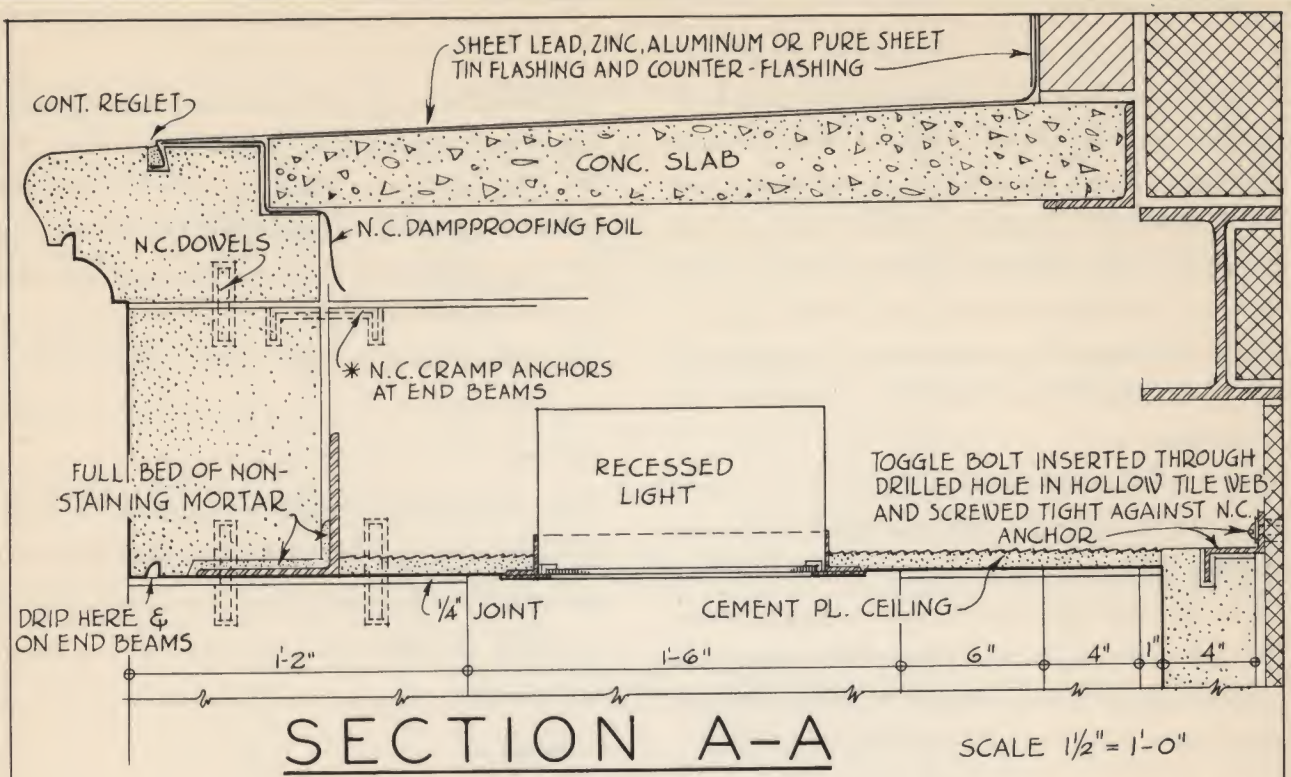
# SCHOOL ENTRANCE DESIGN

PLATE Nº 19

# PLATE NO. 20

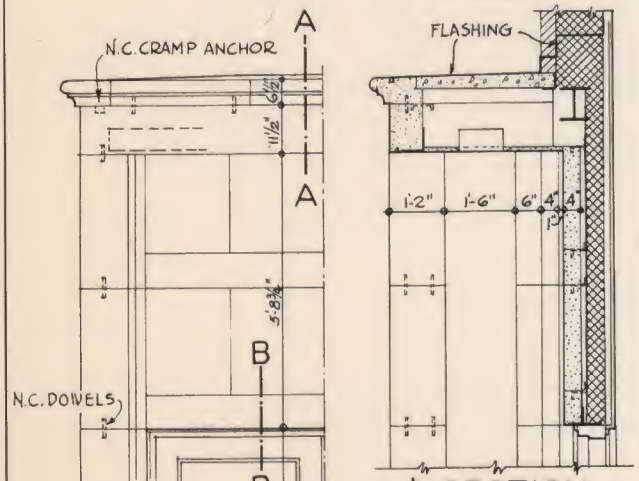
In a treatment, such as this entrance feature, where rain washes down over the edge of the coping, copper should not be used for the flashing. If used, green discoloration of the stone will result from the copper oxide. It will be noted that non-staining metal is used on the roof. The drip on the coping prevents streaking of the stone below. Where it is necessary for a concrete slab to rest on stone, as is shown, it is very necessary that a non-corrosive membrane, such as the damp-proofing foil shown, thoroughly protect the stone from cement stain.

The toggle bolt indicated is a type such as a "Star Snapin" or equal. Design and installation information is available from the manufacturer.

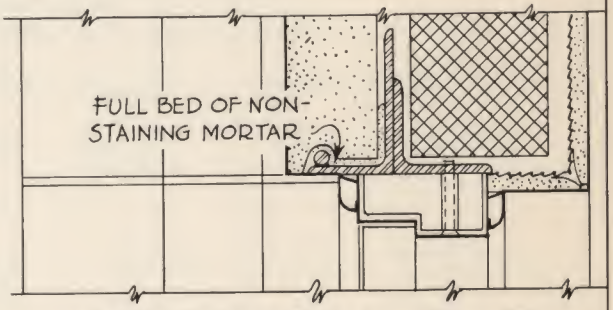



# SECTION A-A

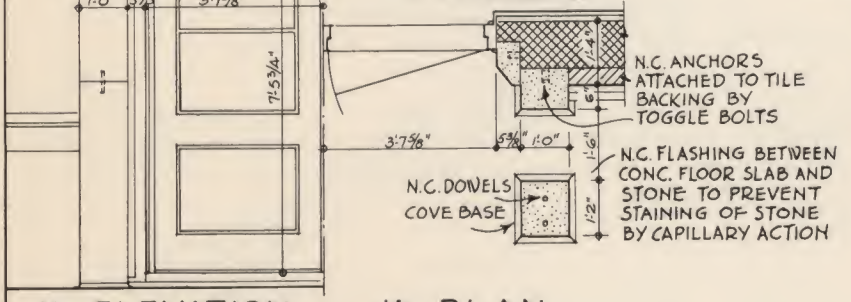
SCALE 1½" = 1'-0"




¢ SECTION




# SECTION B-B




½ ELEVATION ½ PLAN

SCALE 1/4" = 1'-0"

## KEY TO MATERIALS

*NOTE: N.C. = NON-CORROSIVE

- LIMESTONE
- BRICK
- LOAD BEARING TILE
- METAL
- PLASTER

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# DOORWAY DETAIL

PLATE Nº 20

# PLATE NO. 21

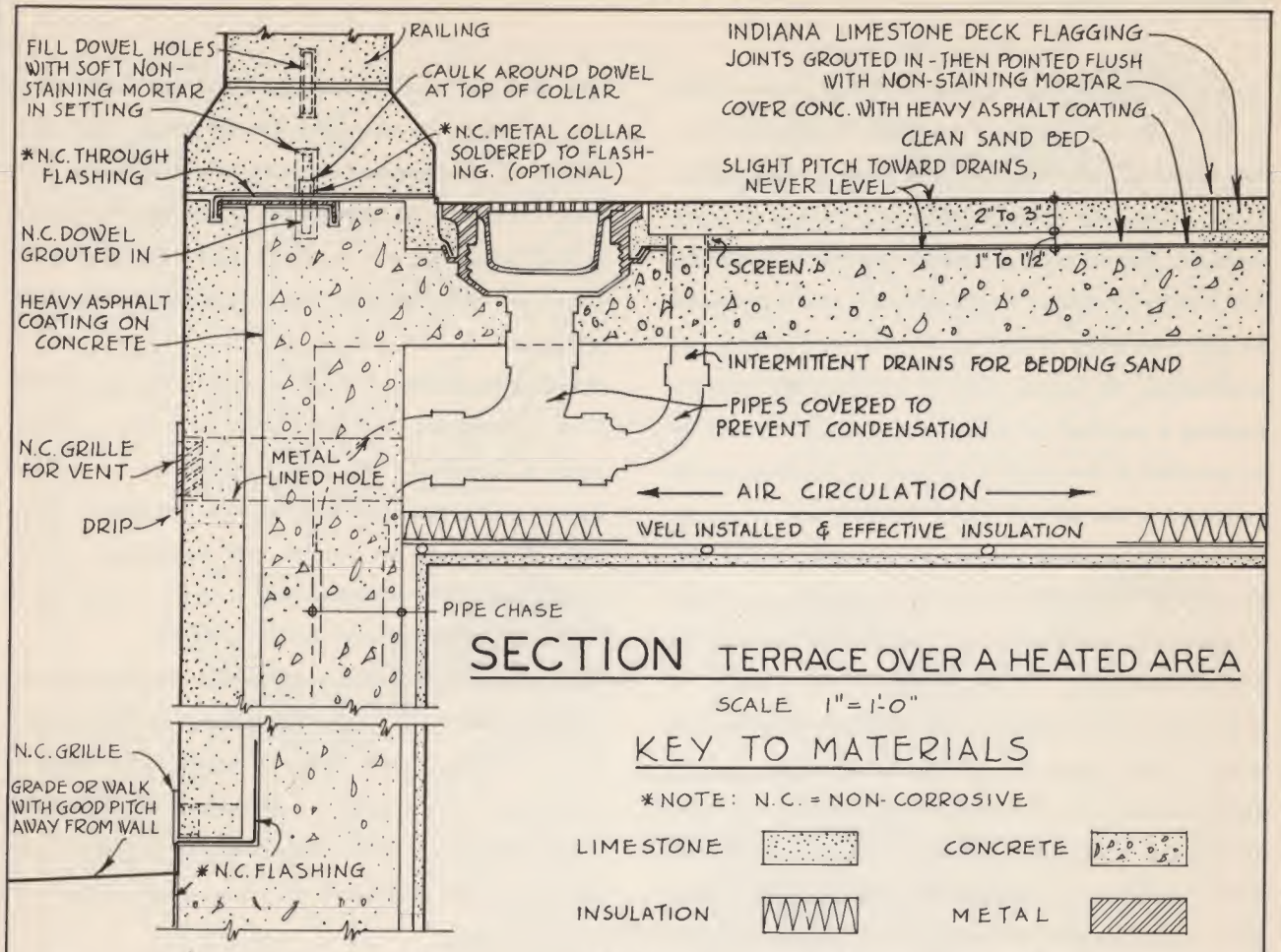
It is very important that stone which is used where it will be subjected to an excess of moisture should have good drainage to reduce the possibility of continued saturation. Under such an adverse condition frost action can be injurious over a period of time. In addition to good drainage, it is important that stone be thoroughly insulated from heated areas of a building for stone which is subjected to heat is more absorbent of moisture than is cold stone.

In the detail showing the section of a terrace over a heated area note that good drainage is provided for the deck flagging. Also note that insulation is provided between the heated room below and the slab carrying the stone. The area between the deck slab and the insulation is vented to the outside to permit air circulation so that the temperature above and below the deck is equalized.

As to the ashlar facing on the side, a vented cavity is provided between the facing and the concrete backing. This serves the purpose of draining any water that may leak in back of the stone, of equalizing the temperatures on both sides of the stone and of preventing possible staining from the concrete backing.

The section showing a heated area under steps is a schematic suggestion showing the same basic principles as shown in the terrace section.

Under "Miscellaneous Suggestions," recommended detailing practices for Indiana Limestone are set forth that will result in economy and in effectiveness. The treatment of a safety tread for steps is very effective. It is recommended that the abrasive material be added to the tread at the job site.



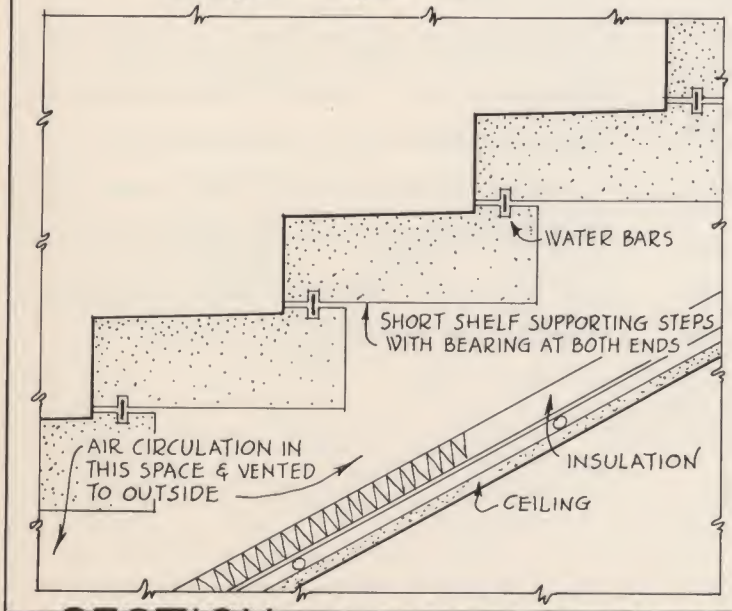

## SECTION TERRACE OVER A HEATED AREA

SCALE 1" = 1'-0"

## KEY TO MATERIALS

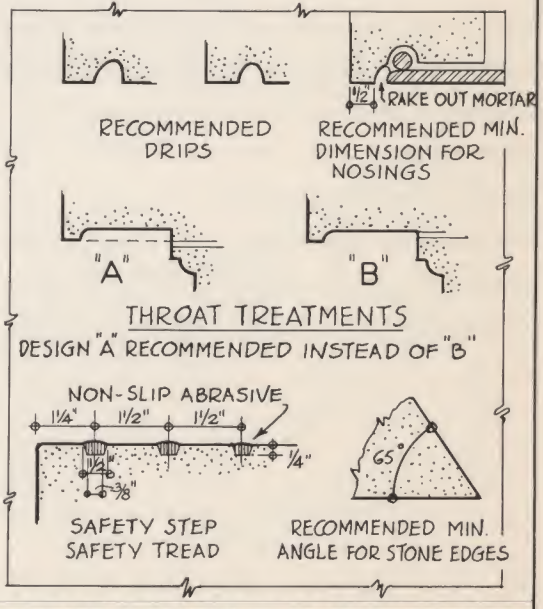
*NOTE: N.C. = NON-CORROSIVE

LIMESTONE | CONCRETE | INSULATION | METAL




## SECTION HEATED AREA UNDER STEPS

SCALE 1" = 1'-0"




## MISCELLANEOUS SUGGESTIONS

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# MISCELLANEOUS DETAILS

PLATE Nº 21

# PLATE NO. 22

Where an informal type of wall is desired, whether it be for an impressive church, a moderate cost residence or for numerous other exterior and interior applications, Indiana Limestone random ashlar strip stone is an ideal material. Due to mass production the cost is moderate. This material is sold on a tonnage basis and is produced to bed thicknesses of 3¾" to 4", one ton covering approximately 40 square feet. If bonding for masonry backing is required, as shown on the plate, it should be so specified so that strips to be used for bonding can be produced to the desired depth. Bonding will, of course, increase the required quantity in proportion to the percentage of bond stones used. The top and bottom horizontal beds are sawed smooth, thus reducing greatly the cost of setting.

The course heights shown on the plate are standardized although the proportion of the various course heights that is furnished in a ton of the material will vary slightly among the individual producers. With ½" mortar bed joints, these course heights will conform with relative brick course heights. Generally the 5" course height is the one used for bonding. The percentages of any course height may be changed or heights omitted entirely by the architect to create a special wall surface effect, at only slight additional cost. However, where this is desired, it should be explicitly specified.

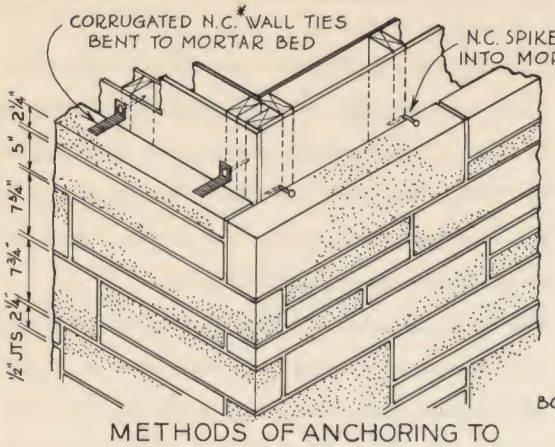
The random lengths in which the material is sold by most producers, range from 2'-0" to 4'-0" although as noted at the bottom of this plate, lengths up to 6'-0" are obtainable from a few producers. These are easily cut to desired lengths by masons at the job site by small portable saws. The greatest economy in setting results from using the strips in as long lengths as possible, thus saving in both labor and mortar. Since most strip stone is furnished with squared ends, very little jointing is necessary at the job.

No selection of color or texture is made. A range of Buff, Gray, Variegated and Old Gothic from fine to coarse grain is furnished. This gives full play to the natural beauty of the stone for informal wall treatments. However, if required for special wall treatments, specific colors, textures and course heights can be obtained, at moderate additional cost, by so specifying.

The architect has a choice of finishes ranging from the rugged "Split-faced" and "Shot-sawed" to the smoother "Chat or Sand-sawed" surfaces. Suggested methods of anchoring random ashlar to different kinds of backing under various conditons are shown on this plate. The designer must select one that will comply with local building codes.

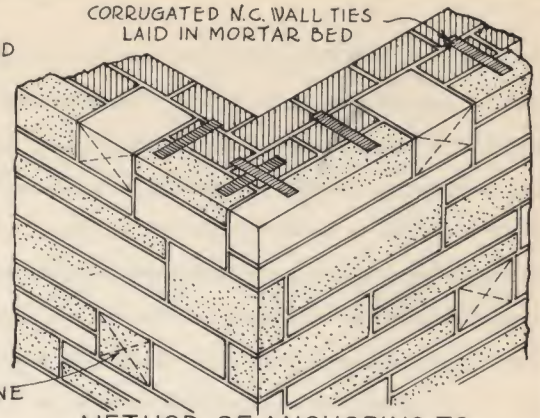
For recommended design of a wall section where random ashlar strip stone is to bond with tile or concrete block backing, see plate 4 and its accompanying text.

Random Ashlar strip stone is produced by various Institute members, some of whom produce it under individual company trade names. (The names of these companies are obtainable upon request from the Institute).




METHODS OF ANCHORING TO

## FRAME BACKING

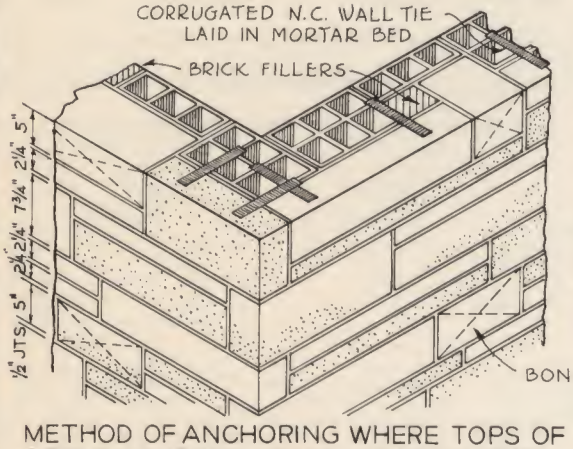



METHOD OF ANCHORING TO

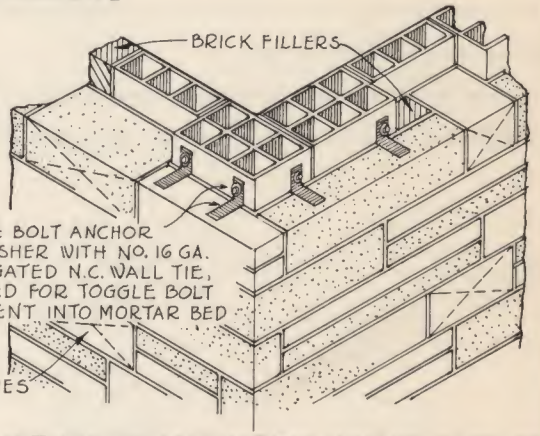
## BRICK BACKING

*NOTE: N.C. = NON-CORROSIVE

STANDARDIZED DIMENSIONS FOR RANDOM ASHLAR WHICH IS USUALLY SOLD BY THE TON

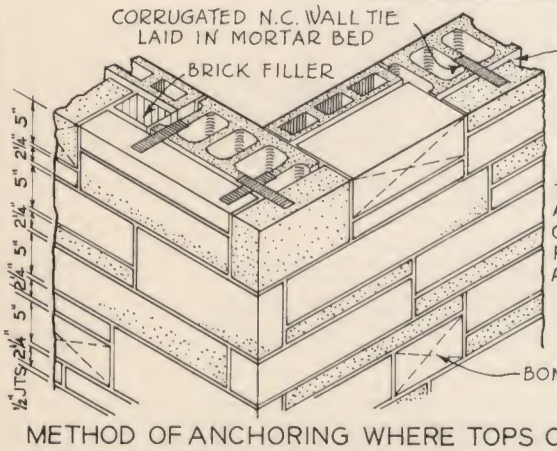



METHOD OF ANCHORING WHERE TOPS OF STONE COURSES LEVEL UP WITH TOPS OF BACKING TILE

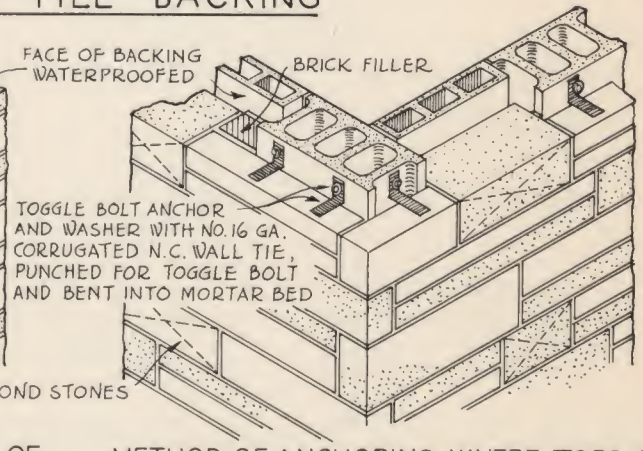



METHOD OF ANCHORING WHERE TOPS OF STONE COURSES DO NOT LEVEL UP WITH TOPS OF BACKING BLOCKS

## HOLLOW TILE BACKING




METHOD OF ANCHORING WHERE TOPS OF STONE COURSES LEVEL UP WITH TOPS OF BACKING BLOCKS*




METHOD OF ANCHORING WHERE TOPS OF STONE COURSES DO NOT LEVEL UP WITH * TOPS OF BACKING BLOCKS

## CONCRETE BLOCK BACKING

AVAILABLE IN UNSELECTED COLORS, TEXTURE AND LENGTHS (2'-0" TO 6'-0") IN SPLIT-FACED, SHOT-SAWN, CHAT-SAWN AND SAND-SAWN FINISHES. GREATEST ECONOMY IN SETTING IS ATTAINED BY USING NO PRE-DETERMINED PATTERN AND BY JOINTING STRIPS AT JOB SITE INTO MAXIMUM LENGTHS POSSIBLE.

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# RANDOM ASHLAR. SUGGESTED ANCHORING FOR VARIOUS TYPES OF BACKING

PLATE Nº 22

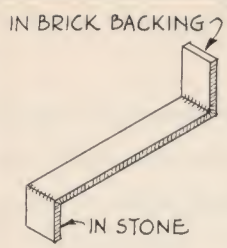
# PLATE NO. 23

Supports and anchors shown are types which it is possible to use for setting Indiana Limestone. The provision of supports is a responsibility of the structural steel contractor and anchors should be specified to be furnished by the stone setter or by the general contractor.

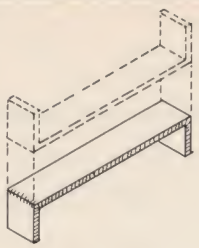
Anchoring is essentially a structural problem. Size, type and number of anchors depend on the size and shape of stone being anchored and on building code requirements. No hard and fast rule exists for size of anchors. Flat type anchors are generally 1" or 1¼" x 3/16". Specific requirements may permit smaller sizes or they may require that the anchors be larger. Rod anchors should provide equivalent cross sectional area.

For special conditions, special supports and anchors must be designed. Where this is necessary, the basic principle to follow is simplicity. Avoid complicated design in anchor schemes. Bear in mind ease of installation and adjustment of the supports and anchors when the stone is set. When structural members are used, it is suggested that standard sized shapes be selected where possible to eliminate extra labor in altering.

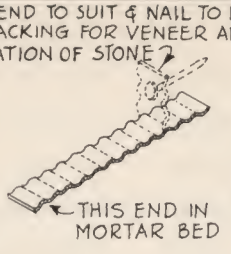
The cut stone fabricator merely provides holes and sinkages in stones for supports, anchors, cramps, dowels, etc., indicated on the architect's and on the approved stone working drawings. Quite often in the preparation of the stone working drawings, the cut stone contractor may make good suggestions for improving or simplifying anchor schemes. It is urged that architects give such well-meant recommendations serious consideration during the process of checking these drawings for approval.



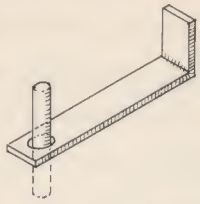

STRAP ANCHOR



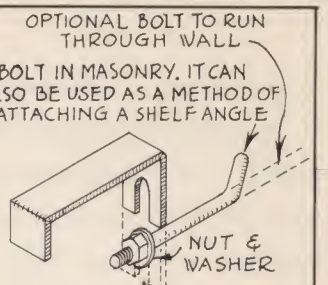
CRAMP ANCHOR



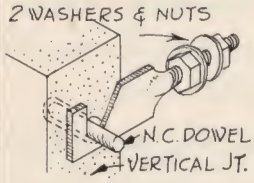

CORRUGATED WALL TIE



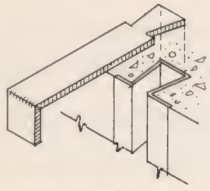
STRAP ANCHOR AND DOWEL




SLOTTED CRAMP ANCHOR & WALL BOLT

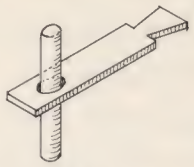



FLATHOOK WALL TIE TO STEEL WEB

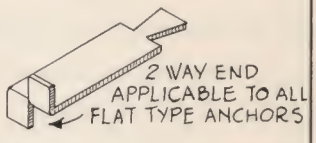


DOVETAIL ANCHOR & SLOT

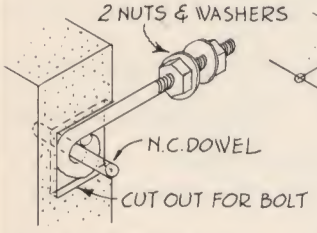
CORRUGATED DOVETAIL ANCHOR



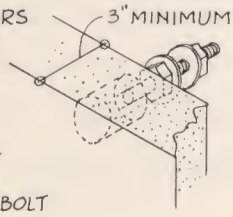
DOVETAIL ANCHOR & DOWEL




TWO-WAY DOVETAIL ANCHOR

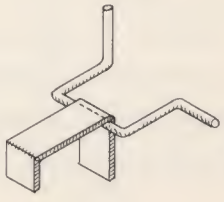



EYE-BOLT TIEBACK TO STEEL WEB

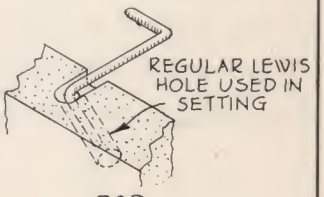



RING WEDGE ANCHOR TO STEEL

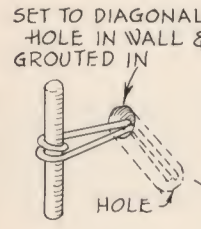
ROD CRAMP ANCHOR



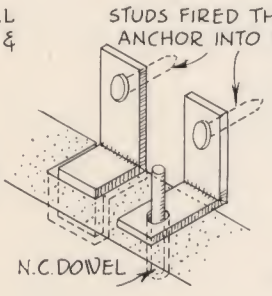
ANCHOR CLIP AND LOOP



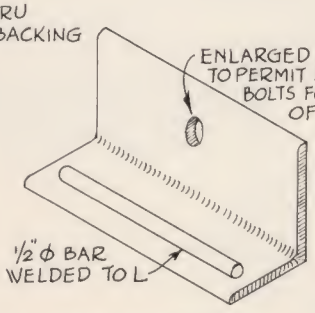

ROD ANCHOR



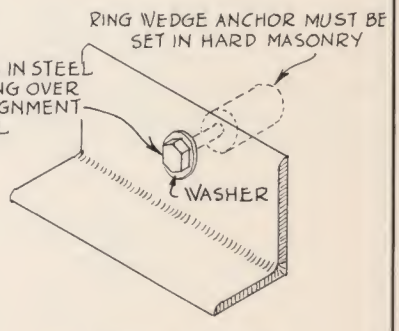

DOWEL AND WIRE ANCHORS




POWDER STUD ANCHORS INTO HARD MASONRY




WELDED BAR LUGS ON SHELF ANGLE SUPPORTS




RING WEDGE ANCHOR FOR SHELF ANGLE SUPPORTS

NOTE: ALL ANCHORS SHOULD BE NON-CORROSIVE WHERE POSSIBLE. THIS IS DOUBLY NECESSARY IN COASTAL REGIONS SUBJECT TO SALT LADEN ATMOSPHERE, WHERE IT IS RECOMMENDED THAT SUPPORTING SHELF ANGLES ALSO BE OF NON-CORROSIVE METAL. RUSTING ANCHORS GROW IN SIZE, DEVELOPING A TREMENDOUS WEDGING TYPE OF STRESS IN SO DOING, AND WILL LITERALLY SPLIT STONE APART AT THE ANCHOR SLOTS.

INDIANA LIMESTONE INSTITUTE

# SUPPORTS AND ANCHORS

PLATE No 23

# PLATE NO. 24

Anchor schemes which require the anchors to be welded to structural steel members should be avoided where possible for they are expensive, requiring special cutting and fitting of the anchors and they slow down the anchor installations. However, there are conditions where such schemes are the easiest and least expensive methods of solving anchoring problems.

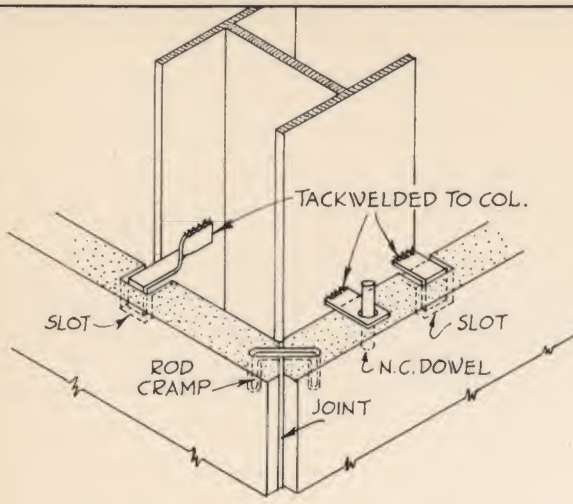
This plate shows suggestions for welded anchors where such anchors are the most practical for a given problem. In the detail for anchoring to steel beams, two of the anchors shown are used in a vertical joint. Quite often such use of anchors is very practical with masonry backing, as well as for a welded condition, where top anchors cannot be used and for high courses.

In any anchor and support scheme adopted by the designer, it should be borne in mind that the checking in the stone, required to receive the anchors and supports, adds to the cost. Anything that can be done to simplify such checking is therefore recommended from the standpoint of economy.

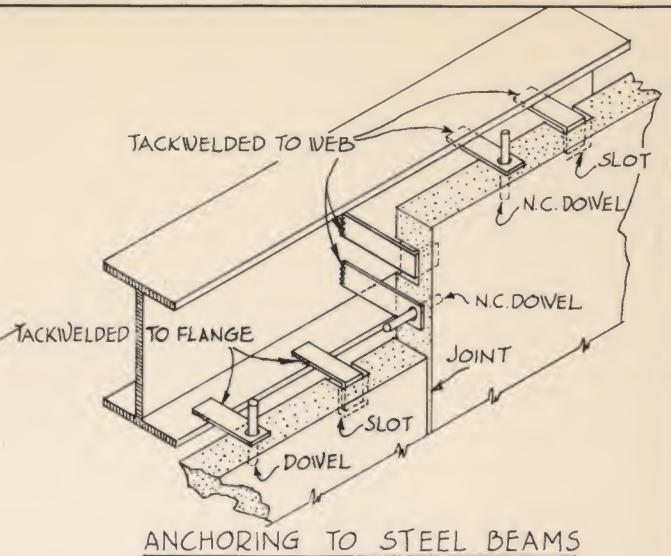
It is for this reason that ring-wedge anchors are desirable since they require only easily drilled holes in the stone. Each design of a soffit requires special design of supports. Various types of suggested supports are set forth on this plate.

As mentioned in the text for Plate No. 23, the provision of supports is a responsibility of the structural steel contractor and anchors should be specified to be furnished by the stone setter or by the general contractor.

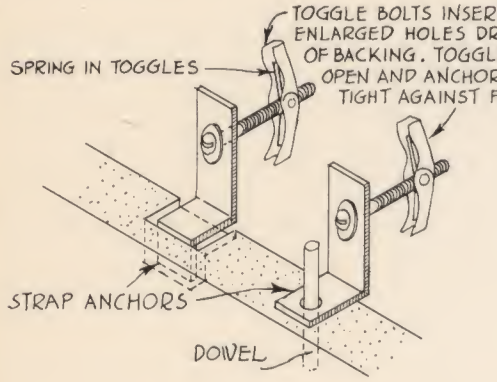
The cut stone fabricator merely provides holes and sinkages in stones for supports, anchors, cramps, dowels, etc., indicated on the Architect's and on the approved stone working drawings. Architects are urged to give serious consideration, during the process of checking and approving the stone working drawings, to suggestions of the cut stone contractor for the simplification of methods of supporting and anchoring the stone.



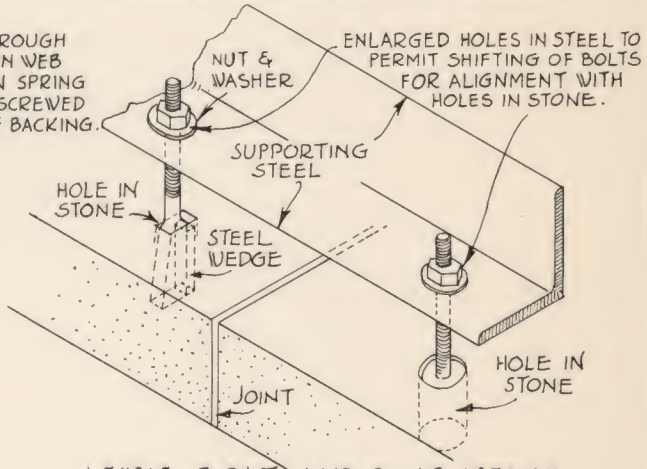

ANCHORING TO STEEL COLUMNS



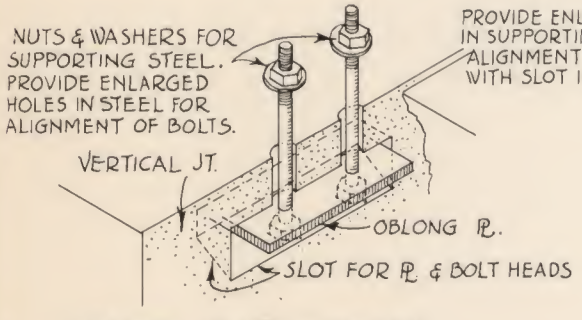

ANCHORING TO STEEL BEAMS



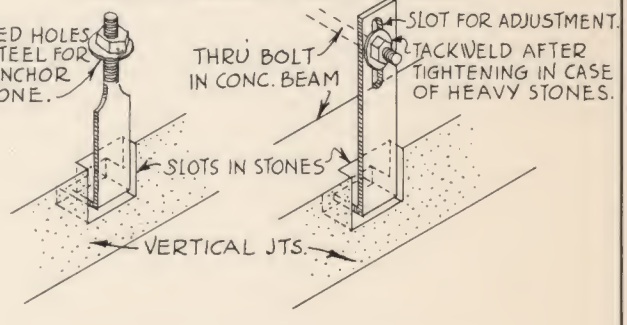

TOGGLE BOLTS FOR BLOCK OR TILE WALLS




LEWIS BOLT AND RING WEDGE SOFFIT HANGING




OBLONG PLATE HANGER FOR SOFFIT HANGING




STRAPS FOR SOFFIT HANGING

NOTE: ALL ANCHORS SHOULD BE NON-CORROSIVE WHERE POSSIBLE. THIS IS DOUBLY NECESSARY IN COASTAL REGIONS, SUBJECT TO SALT LADEN ATMOSPHERE, WHERE IT IS RECOMMENDED THAT SUPPORTING SHELF ANGLES ALSO BE OF NON-CORROSIVE METAL. RUSTING ANCHORS GROW IN SIZE, DEVELOPING A TREMENDOUS WEDGING TYPE OF STRESS IN SO DOING, AND WILL LITERALLY SPLIT STONE APART AT THE ANCHOR SLOTS.

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# SUPPORTS AND ANCHORS

PLATE Nº 24